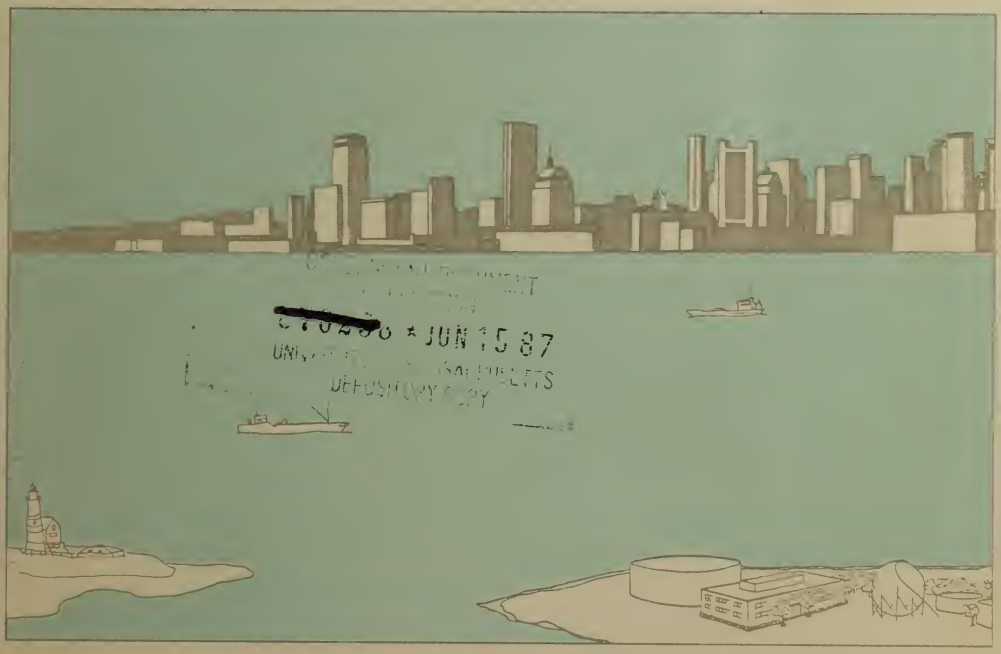
M W R A

CAPITAL IMPROVEMENT PROGRAM

FISCAL YEARS 1987 1989



Massachusetts Water Resources Authority

CAPITAL IMPROVEMENT PROGRAM

Fiscal Year 1987 - 1989

Michael Gritzuk
Executive Director

Prepared by:
Budget Department,
Administration and
Finance Division

Cover Based on
Original Drawing by:
Greg Alessandro,
Manager of CSOs,
Sewerage Division

Massachusetts Water Resources Authority

BOARD OF DIRECTORS

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MASSACHUSETTS WATER RESOURCES AUTHORITY
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CAPITAL EXPENDITURE BUDGET
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Introduction

The Massachusetts Water Resources Authority (MWRA) began operations on July 1, 1985. The Authority is responsible for distribution of water to 45 cities and towns and collection and treatment of sewage from 43 communities. The Authority operates and maintains waterworks and wastewater facilities that are located from Quabbin Reservoir in western Massachusetts to Boston Harbor.

Pursuant to Section 8(b) of Chapter 372 of the Acts of 1984 (the Enabling Act) the Authority is periodically required to adopt and revise capital expenditure budgets and facilities programs and to consult with its Advisory Board and with the Massachusetts Executive Office of Environmental Affairs in the preparation of such documents.

This Facilities Program and Capital Expenditure Budget has been prepared in accordance with the Enabling Act provisions and is a comprehensive proposal for all projects requiring capital expenditures in FY 1987, FY 1988 and FY 1989.

Capitalization Policy

It is the policy of the Authority that capitalization of expenditures be in conformance with generally accepted accounting practice standards. Except in the instance of a one-time cost of establishing the Authority, a capital expenditure is intended to result in the acquisition, rehabilitation or expansion of a fixed asset. The capitalizable cost of a fixed asset includes not only its purchase price or construction cost, but also ancillary charges necessary to place the asset in its intended location and condition for use. Ancillary costs can include, but are not limited to, costs for planning studies, professional fees, transportaion charges, site preparation expenditures, and legal fees and claims directly attributable to asset acquisition.

The following criteria have been used to qualify expenditures for inclusion in the proposed FY 1987 - FY 1989 Facilities Program and Capital Expenditure Budget. A capital expenditure can be for a one-time cost of organizing the Authority. An expenditure can be for the purchase, repair or replacement of an item, or group of items, which have a useful life of five years or more and generally cost more than twenty-five thousand dollars to be expended in one fiscal year. An expenditure can be for a one-time correction of many years of deferred maintenance. All other expenditures shall be contained within the Authority's Current Expense Budget.

Budget Preparation Process

The Authority adopted its first three year Facilities Program and Capital Expenditure Budget on August 5, 1985. That budget included new programs and existing capital projects inherited from the Authority's predecessor agency, the Metropolitan District Commission.

This proposed FY 1987 - FY 1989 is the first Facilities Program and Capital Expenditure Budget prepared under the direction of the Authority's Executive Director, Michael Gritzuk. In June, 1986 The Executive Director instructed staff that a comprehensive review of all on-going and proposed capital programs was required. Capital budget submission forms were developed to standardize information for each project and were designed to collect the following information:

Project Title
Description
Justification
Priority
Responsible Division
Expected Useful Life of the Capital Asset
Internal and External Project Constraints
Project Status and Schedule
Project Phase Description
Existing Contractual Obligations by Phase
Total Project Cost
Prior Expenditures
Remaining Balance
Future Expenditure Cash Flow
Current Expense Budget Impact
Grant Status
Total Grant Awards
Prior Grant Receipts
Remaining Grant Receipt Balance
Future Grant Receipt Cash Flow

The review process began with budget hearings conducted by the Executive Director to determine the adequacy of project descriptions and justifications. Each project in this capital facilities program meets one or more of the following criteria for inclusion in the Authority's Capital Expenditure Budget:

1. The project is required for court schedule or regulatory compliance.

2. The project improves workplace safety.

3. The project provides information or results in system improvements which are required to evaluate or undertake other necessary projects.

4. The project improves service effectiveness or efficiency.

5. The project improves Authority revenue production capabilities.

These criteria are listed in relative order of importance given the Authority's current objectives, and they combine the need to rectify current deficiencies of the systems and to plan for future improvements of the systems.

Approved projects were then analyzed to determine if project schedules were realistic and achievable given prior performance indicators and internal and external constraints on project progress. Project schedules underwent three iterations prior to Executive Director approval during which each project was evaluated to determine its sequencing or scheduling. The following implementation objectives were considered during the scheduling iterations:

1. To effectively manage the total facilities program and individual projects given internal resource constraints.

2. To take full advantage of opportunities to maximize state and federal funding assistance.

3. To identify and plan for external constraints which impact project schedules.

The final review step involved confirmation of the contractual and financial data on each project.

The proposed budget is presented in three major program areas: wastewater, waterworks and administration. Each program area is divided into program categories as follows:

Wastewater
- Interception and Pumping
- Treatment
- Residuals
- Combined Sewer Overflows
- Other Capital Projects

Waterworks
- Supply and Treatment
- Transmission
- Distribution and Pumping
- Other Capital Projects

Administration
- Equipment
- Buildings
- Other Capital Projects

Each of these program categories consists of individual project proposals. Projects are futher sub-divided into project phases which represent the study, design, construction and other components of the project at the contractual level.

Capital Budget Summary

The proposed MWRA Facilities Program and Capital Expenditure Budget includes proposed expenditures of $387.5 million in constant dollars for FY 1987 - FY 1989. This amount includes the cost of all current contractual obligations and future project phases scheduled during the three year timeframe. Table 1 presents the fiscal year spending levels by program area. The FY 1987 expenditure level is expected to be $71 million. In FY 1988 capital expenditures are projected to rise to $143.8 million. The FY 1989 capital costs will amount to $172.7 million. The accompanying pie chart shows the total three year distribution by program.

Table 2 presents the project grant receipts for the three year period totaling $139.6 million. Receipts in FY 1987 are expected to be $13 million. For FY 1988 receipts are anticipated to yield $58.6 million. The FY 1989 grant revenue is estimated to be $68 million.

Grant revenue is received by the Authority in recognition of prior expenditures for improvements to, or construction of, capital facilities. It is the policy of the Authority that grant receipts be applied either to capital expenditures, thereby reducing borrowing, or to payment of debt, both principal and interest, incurred to finance capital expenditures.

If the projected FY 1987 -1989 grant revenue is applied to capital expenditures, the amount that the Authority must finance is $247.9 million as shown in Table 3.

MASSACUSETTS WATER RESOURCES AUTHORITY
FACILITIES PROGRAM
AND
CAPITAL EXPENDITURE BUDGET
FY 1987 - FY 1989
(000s)

TABLE 1
EXPENDITURES BY PROGRAM

Program	FY87	FY88	FY89	FY87-89 Total	Beyond FY89
Wastewater	$53,236	$107,620	$130,834	$291,690	$266,009
Waterworks	6,019	15,236	22,422	43,677	86,305
Administration	8,793	12,209	3,253	24,255	800
Contingency	3,000	8,700	16,200	27,900	19,700
Total	$71,048	$ 143,765	$172,709	$387,522	$372,814

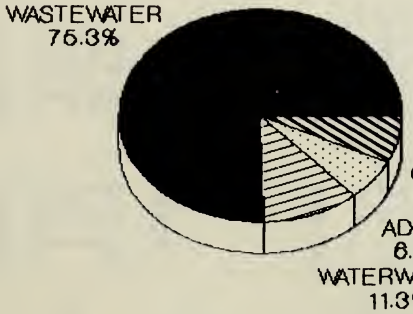
TABLE 2
PROJECTED GRANT REVENUE

Program	FY87	FY88	FY89	FY87-89 Total	Beyond FY89
Wastewater Int. and Pumping	$ 4,761	$15,763	$33,728	$54,252	$ 91,079
Wastewater Treatment	7,296	32,232	27,413	66,941	121,852
Wastewater Residual	0	4,067	1,296	5,363	630
Wastewater CSO	909	6,524	5,611	13,044	3,267
Total	$12,966	$58,586	$68,048	$139,600	$216,828

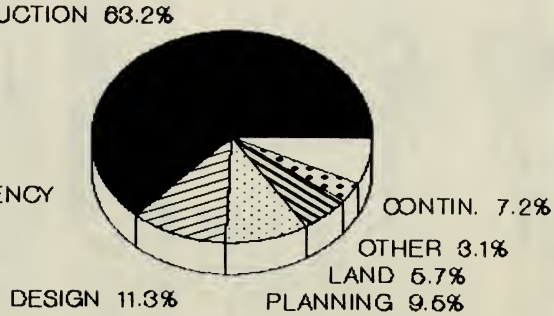
TABLE 3
CAPITAL BUDGET FINANCING

Program	FY87	FY88	FY89	FY87-89 Total	Beyond FY89
Wastewater	$40,270	$49,034	$62,786	$152,090	$ 49,181
Waterworks	6,019	15,236	22,422	43,677	86,305
Administration	8,793	12,209	3,253	24,255	800
Contingency	3,000	8,700	16,200	27,900	19,700
Total	$58,082	$85,179	$104,661	$247,922	$155,986

MWRA FACILITIES PROGRAM
FY87-89 CAPITAL EXPENDITURE BUDGET



PROGRAM



PROJECT PHASE

Projected Grant Revenue

Table 2 presents projected grant revenue for wastewater projects included in the FY 1987-FY 1989 facilities program. Anticipated grant revenue over the three years is $139.6 million, an amount which is 47.9% of expenditures planned for wastewater projects and 36% of total three year expenditures. Projected grant reimbursements rise from $13.0 million in FY87 to $58.6 in FY88 and $68 million in FY89.

Projected grant revenue has been calculated for each project phase based on the assumptions that current grant programs will continue over the three year period with 90% of eligible costs reimbursed two quarters after Authority expenditures are made. Grant revenue cash flows by project are detailed following the cash flows for wastewater projects.

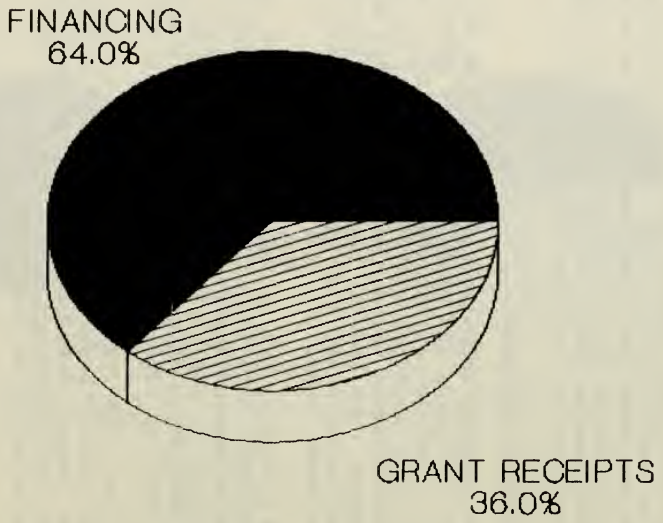
Authority Financing

The proposed three year capital budget with expenditures of $387.5 million and grant revenue of $139.6 million would require $247.9 million in Authority financing. Contingency dollars used for grant eligible project phases may be reimbursable, and such reimbursements would reduce the amounts which the Authority must finance. The amounts required will initially be financed with short-term notes which will eventually be converted into long-term bonds.

The Authority has included debt service payments for an additional note issue in its FY87 budget which will finance FY88 capital expenditures. An additional $100 million will be borrowed in FY89. Assuming a 5% interest rate with no retirement of short-term debt, the incremental increase in debt service cost in FY88 and FY89 would be $1.62 and $5 million respectively.

In 1990, the $247.9 million in short-term borrowings required by this capital budget are expected to be converted into a long-term bond issue. Based on a 30 year maturity and a 7.5% interest rate, the increased debt service over the 1989 base would be approximately $8.5 million.

MWRA FACILITIES PROGRAM
FY87-89 CAPITAL REVENUE BUDGET



Current Expense Budget and Projected Rate Impacts

The proposed Facilities Program will affect the Authority's annual operating budget when capital facilities come on-line and generate revenue or require additional personnel or other operating expense. Each project description gives information concerning the amount and timing of projected current expense budget impacts. Table 4 and 5 summarize by program the estimated impact that the Capital Expenditure Budget will have on the Authority's Current Expense Budget over the next four fiscal years. The cumulative impact is expected to be $15.5 million, exclusive of debt service. The cost of borrowing to finance the proposed facilities program would add an additional $15.1 million by 1990, for a total current expense budget increase of nearly $30.6 million by FY 1990.

Net additional operating and financing costs resulting from this proposed Facilities Program will increase required rate revenue. Table 6 shows annual and total increases in rates which result from this capital budget. These amounts do not include the additional rate revenue required to support operations and maintenance cost increases which are unrelated to the Authority's capital facilities program. When these additional costs are detailed in the Authority's current expense budgets, annual rate increases are expected to be higher than those described in this document.

MASSACHUSETTS WATER RESOURCES AUTHORITY
CURRENT EXPENSE BUDGET AND RATE IMPACTS OF THE CAPITAL EXPENDITURE BUDGET
(000s)

TABLE 4
ANNUAL CURRENT EXPENSE BUDGET IMPACT OF THE FY 1987-89 CAPITAL BUDGET

Program	FY88	FY89	FY90	Total
Sewerage Division	$ 0	$ 8,324	$7,200	$15,524
Waterworks Division	(450)	(114)	110	(454)
Support Division	333	99	0	432
Debt Service	1,620	5,000	8,500	15,120
Total	$1,503	$13,309	$15,810	$30,622

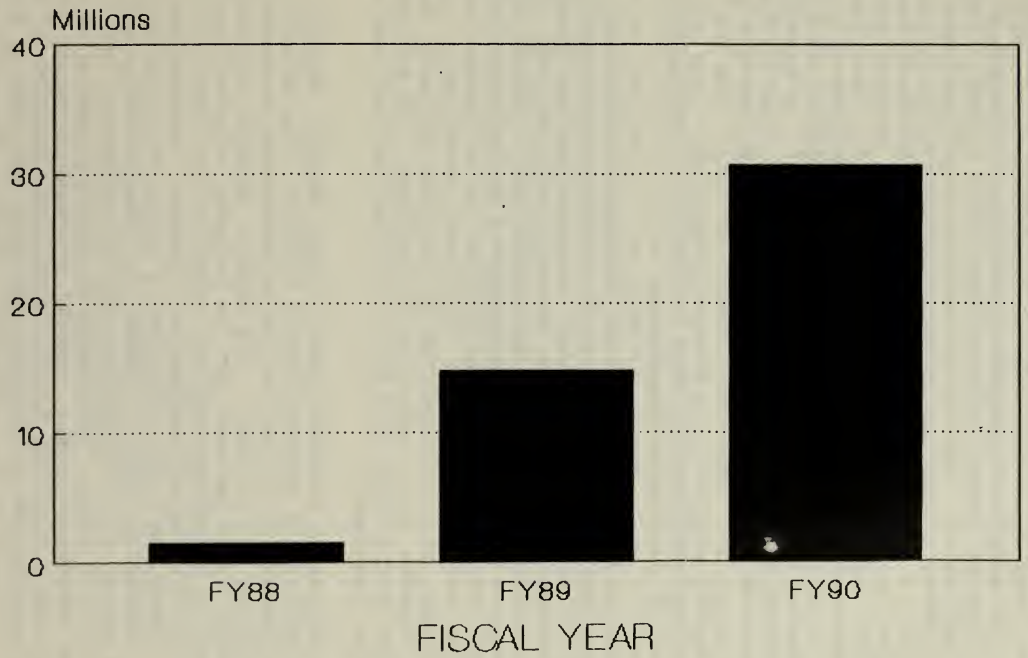
TABLE 5
CUMULATIVE CURRENT EXPENSE BUDGET IMPACT OF THE FY 1987-89 CAPITAL BUDGET

Program	FY88	FY89	FY90
Sewerage Division	$ 0	$ 8,324	$15,524
Waterworks Division	(450)	(564)	(454)
Support Division	333	432	432
Debt Service	1,620	6,620	15,120
Total	$1,503	$14,812	$30,622

TABLE 6
ANNUAL RATE INCREASE DUE TO THE FY 1987-89 CAPITAL IMPROVEMENT PROGRAM

RATE BASE		FY88	FY89	FY90	Total
Water:	Dollars	$ 211	$1,269	$2,405	$3,885
	Percentage	.7%	4.2%	7.6%	12.8%
Sewer:	Dollars	$1,292	$12,040	$13,405	$26,737
	Percentage	2.1%	19.5%	18.2%	44.3%
Combined:	Dollars	$1,503	$13,309	$15,810	$30,622
	Percentage	1.7%	14.4%	15.0%	33.8%

MWRA CAPITAL FACILITIES PROGRAM
CUMULATIVE CURRENT EXPENSE BUDGET IMPACT



Capital Budget Contingency, Amendment and Reserve

A contingency is incorporated into the Capital Expenditure Budget for FY 1987 - FY 1989 for the purpose of providing funds for costs associated with capital projects which cannot be projected with an acceptable degree of certainty. Transfers from the contingency budget to the budget for a capital project phase can be made at any time during the budget period. Such transfers will occur automatically when the Board of Directors or the Executive Director authorizes either a contract award amount higher than the budgeted figure for the project phase, or change orders and contract amendments that result in a contract amount higher than budgeted. The contingency budget is also to be used for legal costs and any claims and damages arising from the Authority's capital improvement program. If the contingency has been exhausted, a budget amendment authorized by the Board of Directors and reviewed by the Advisory Board is required to replenish it. Upon the transfer of funds from the contingency to a capital project, the Finance Committee of the Board of Directors will be informed in writing of the amount and project to which funds are transferred.

From time to time, it may be necessary to amend the Capital Expenditure Budget. Amendments are required when an unbudgeted capital project is proposed; a capital project budget, including all contingency transfers, has been exhausted by contract awards, or the contingency is to be replenished. In such cases, the Executive Director may recommend to the Board of Directors a budget amendment which can include new or higher amounts for individual projects or an additional contingency amount. The amendment will be submitted to the MWRA Advisory Board for review and comment for a period of thirty days. At the end of the thirty day period, the Board of Directors may take action on the budget amendment.

The Authority currently has a total Repair, Renewal and Rehabilitation Reserve of $16 million. The waterworks portion of the reserve is $6 million while wastewater accounts for the remaining $10 million. The Repair, Renewal and Rehabilitation Reserve is to be used for the purpose of providing funds for the costs of emergency repairs, renewals and rehabilitation of or to the waterworks and wastewater systems. Amounts may not be withdrawn until the Authority's Executive Director has specified the emergency repair, renewal or rehabilitation project to which the amount will be applied and its estimated cost and estimated completion date. The Executive Director must also certify that such emergency repair, renewal or rehabilitation project is reasonably required for the continued operation of the systems or for maintenance of revenues and that the cost of such project is not included in the Authority's Capital Expenditure Budget.

Capital Budget Controls and Reporting

Monitoring and reporting on the capital program is required for managerial control and financial planning. Quarterly reports will be prepared by each division to show planned project phase timetables in comparison to actual performance and planned capital expenditures in comparison to actual expenditure. Each Division will submit these reports to the Budget Department which will be responsible for preparing summaries for all the divisions for the Executive Director.

On a quarterly basis, the Executive Director will submit to the Board of Directors a capital program report that will include planned project schedules and expenditures in comparison to actual performance. In instances where actual project schedules are one quarter (three months) at variance from the planned timetable, the report will include an explanation of the schedule variance.

For purposes of financial planning, cash flow projections for the entire capital program will be updated periodically. In January of each year a revision of the expenditure cash flow will be prepared by the Budget Department based on six months of schedule and expenditure reports received from the divisions. In addition, the grant receipts cash flow will be updated in January by the Grants Manager. Both the capital expenditure and grant receipts cash flow will be forwarded to the Executive Director, Administration and Finance Director and Treasurer for use in updating the financing plan for the Authority.

WASTEWATER

WASTEWATER FACILITIES PROGRAM AND CAPITAL EXPENDITURE BUDGET FY 1987 - 1989

Introduction

The Authority's wastewater system consists of collection, transport, pumping, treatment and disposal of sewage received from 43 communities serving over two million people. The Sewerage Division is responsible for operations and maintenance of the system consisting of 230 miles of interceptor sewer lines, 10 pumping stations, 4 headworks, 2 primary treatment plants and 4 combined sewer overflow facilities for the screening and chlorination of combined sewerage and stormwater. The wastewater system receives sewage flows from 5,400 miles of city and town sewers at 1,823 connection points.

The Sewerage Division is responsible for identification of wastewater system capital needs. The Division maintains responsibility to undertake capital maintenance projects. However, the Engineering Division is responsible for planning and design of major capital improvements, and the Construction Division is responsible for construction of these improvements.

Capital Budget Summary

The Wastewater Facilities Program and Capital Expenditure Budget for FY 1987 - FY 1989 includes proposed outlays of $291.7 million. The program budget includes outlays in five program categories: interception and pumping, treatment, residuals, combined sewer overflows and other capital projects. Table 7 summarizes three year project expenditures in each of the five program areas. Retainage payments due for completed projects are also shown. These figures represent the cash flow required during the three year period, including expenditures for which the Authority expects to receive reimbursement under Federal and State of Massachusetts grant programs.

To complete the projects contained in the proposed facilities program, expenditures beyond FY 1989 are necessary since some project phases are scheduled for completion beyond June 30, 1989. It is anticipated that $266 million will be required to continue the facilities program beyond FY 1989. This figure does not include the cost of construction of the new secondary treatment plant or other capital projects to be initiated after FY 1989.

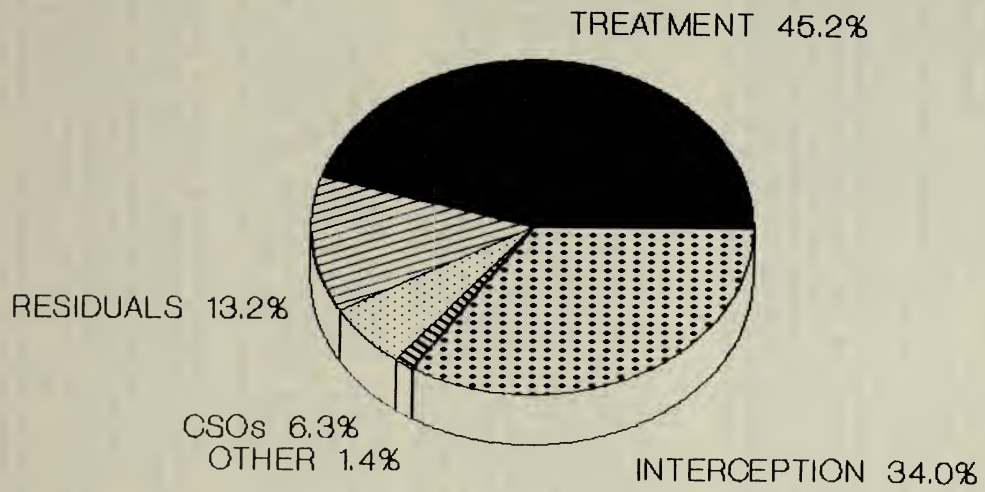
Descriptions of the individual capital projects in each program category follow this summary. These descriptions include estimates of grant revenue per project. Detailed revenue and expenditure cash flows for the Wastewater Facilities Program follow the project descriptions.

Table 7

WASTEWATER FACILITIES PROGRAM AND CAPITAL EXPENDITURE BUDGET FY 1987 - 1989 (000s)

Program Category	FY87	FY88	FY89	FY87-89 Total	Beyond FY89
Interception&Pump.	$15,494	$32,967	$50,557	$ 99,018	$80,752
Treatment	25,554	44,803	61,322	131,679	99,567
Residuals	9,441	15,451	13,609	38,501	83,000
Comb.Sewer Overflows	2,302	12,149	3,846	18,297	2,690
Other Projects	196	2,250	1,500	3,946	0
Retainage	249	0	0	249	0
Total	$53,236	$107,620	$130,834	$291,690	$266,009

WASTEWATER FACILITIES PROGRAM
FY87-89 CAPITAL EXPENDITURE BUDGET



Related Proceedings

On June 7, 1983 the Conservation Law Foundation filed suit in United States District Court in Massachusetts against the Metropolitan District Commission (MDC) and the U.S. Environmental Protection Agency Regional Administrator alleging pollution of Boston Harbor in violation of the Massachusetts Clean Water Act. That case was stayed on March 24, 1984 because of the pendency of the related Norfolk County Superior Court case filed in 1982 by the City of Quincy.

On January 31, 1985 the United States filed a separate suit at the request of the EPA Administrator alleging violations of the Federal Clean Water Act and of the defendents' Federal permits and prior EPA administrative orders. The defendants in this case are the Commonwealth of Massachusetts' Executive Office of Environmental Affairs, the Boston Water and Sewer Commission and the Massachusetts Water Resources Authority.

On May 22, 1985, the Federal Court vacated the stay of the Conservation Law Foundation's case and granted the Foundation's motion to consolidate its case with that of the United States. On motions by the plaintiffs for partial summary judgement, the Court found that the Massachusetts Water Resources Authority as the successor to the MDC was liable for certain violations of the Federal Clean Water Act. This finding was followed by a series of hearings during which each party to the suit presented its suggested schedule of remedial actions. On December 23, 1985, the Court ordered a schedule of activities to be undertaken by the MWRA to help achieve and maintain compliance with the requirements of the Act.

The Court's Schedule One includes four categories of activities: Deer Island Treatment Plant Upgrading, Short-Term Sludge and Scum Management, Long-Term Sludge Management and New Boston Harbor Secondary Treatment Plant. For each category, the schedule dictates a monthly listing of activities to be performed, in large part, by the MWRA. The Authority is obligated to report on its compliance with the Court's schedule on a monthly basis.

The Court issued Schedule One as a partial remedy, and it intends to order further actions to resolve outstanding complaints. The schedule has been amended by two subsequent Court orders. On May 8, 1986, target dates were added for commencement and completion of construction of piers and staging areas, primary treatment facilities, cross-harbor sewage transmission tunnels, effluent outfalls and secondary treatment facilities. In addition, on June 27, 1986, the schedule was amended to include activities to complete interim dewatering of sludge and submission of plans for implementation of mid-term sludge management.

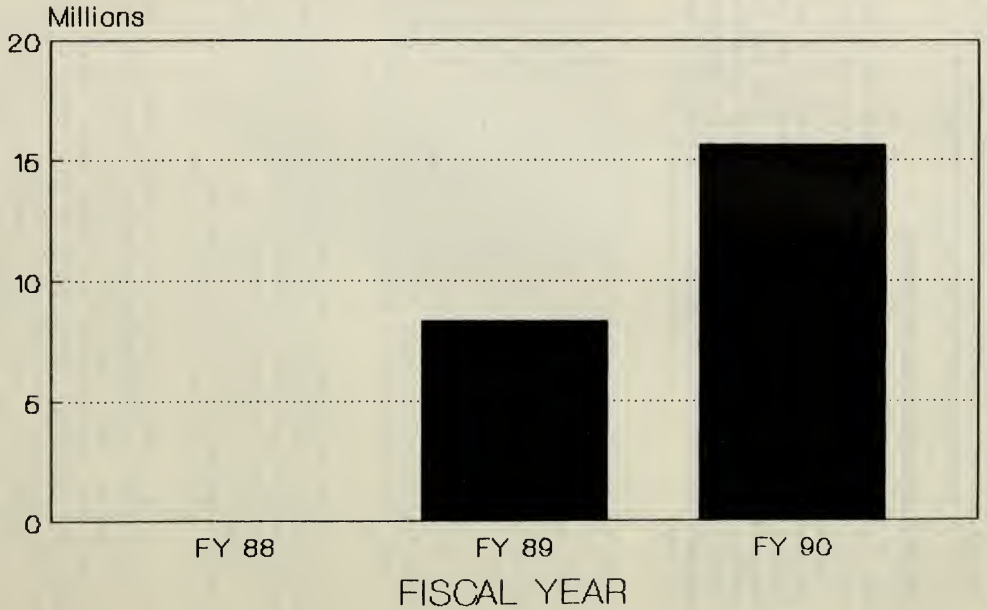
The Court-ordered activities form a significant portion of the Wastewater Facilities Program and Capital Expenditure Budget. The Court's schedule currently includes activities which must be undertaken from 1986 through 1999. As a result the Federal Court litigation will continue to exert strong influence on wastewater capital planning, scheduling and budgeting.

Current Expense Budget Impact

The Authority's Current Expense Budget will be impacted by the addition of new and expanded wastewater collection, pumping and treatment facilities. The accompanying chart presents the projected impact on the Sewerage Division's Current Expense Budget for the next three fiscal years. The projects primarily responsible for large cost increases are the interim scum and sludge processing facilities which are scheduled to become operational in FY 1989. The individual project Current Expense Budget impacts are detailed in the project descriptions which follow.

SEWERAGE DIVISION

CUMULATIVE CURRENT EXPENSE BUDGET IMPACT



INTERCEPTION AND PUMPING

Braintree - Weymouth Relief Facilities

Description and Justification

The Braintree - Weymouth Interceptor and Pump Station serve sections of Braintree, Hingham, Holbrook, Randolph, Weymouth and Quincy. The interceptor system was built in the early 1930s and the pump station in 1937. Since these facilities were constructed, population increases in the communities have far exceeded those anticipated at the time of design. As a result, the sewerage system has insufficient capacity for the volume of sewage received. The pump station has a peak flow deficiency of 13 million gallons a day (mgd) and the interceptor system deficiency ranges from 9 to 29 mgd. Certain sections of the interceptor system such as the Mill Cove Siphon cannot even convey the peak dry weather flows. Consequently, sewage overflows are severe and frequent. Surcharging is expected to increase in the future since the current 115,700 service population is projected to rise to 143,400 in the year 2000 and 161,200 by year 2020.

The project consists of new relief facilities as follows: a 60 mgd replacement pump station at the site of the existing station in Quincy, approximately 10,000 linear feet of 48 and 60 inch interceptor sewer, a twin barrel 48 inch, 1,650 linear foot replacement siphon at Mill Cove, and a twin barrel, 36 inch, 800 linear foot replacement siphon at Fore River.

The pump station and interceptors are expected to have a useful life of fifty years. Equipment is expected to have a useful life of fifteen years.

Project Status and Schedule

The project requires facilities planning, an evironmental impact report, land acquisition, two design and construction contracts, and a construction services and resident inspection contract. Facilities Planning is substantially complete. The EIR and initial design work began in January, 1985 and may be complete in August, 1987 if all state, local and federal permits and approvals are granted within schedule. A second design phase will begin in August, 1987 and be complete by July, 1988. Construction services and resident inspection will begin in March, 1988 and end in July, 1991. The first phase of construction can begin in June, 1988 and be completed by August, 1990. The final construction phase is scheduled to begin in August, 1989 and be completed in July, 1991.

The Engineering Division will be responsible for this project through design.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Fac.Plan.	C.E. Maguire	5311	$346,659	$326,626	$20,033
EIR/Des.1	C.E. Maguire	5312	675,763	204,828	470,935
Design 2	To Be Selected		850,000	0	850,000
Land Acq.			100,000	0	100,000
Constr.1	To Be Selected		9,100,000	0	9,100,000
Constr.2	To Be Selected		18,000,000	0	18,000,000
Con. Ser.	To Be Selected		1,500,000	0	1,500,000
Total			$30,572,422	$531,454	$30,040,968

Authority Share

$3,734,422 (12.2%). The Authority has received a grant for the facilities planning phase. It is anticipated that future awards will be received for the design and construction phases.

Current Expense Budget Impact

The Sewerage Division Current Expense Budget is expected to increase by $90,000 in FY 1991, due to increased labor and utility costs at the Braintree - Weymouth Pump Station.

Charlestown Pump Station Replacement

Description and Justification

The Charlestown Pump Station was built in 1895 and serves Cambridge, Somerville, Medford and Charlestown. The service area has 125,000 people. The station's old pumping units are inefficient and susceptable to frequent breakdowns causing overflows into the Mystic River. The station's other equipment for heating, ventilation and flow metering is also obsolete. Due to space limitations at the existing station, rehabilitation is not a feasible alternative. Total replacement of the station is necessary.

The project consists of construction of a new 93 mgd pump station on the Charlestown and Everett border, adjacent to the present facility. The work includes 200 feet of 60 inch influent sewer, new surface and subsurface structures to house the pumps and screen room, stand-by power generator, flow meters, and personnel facilities. The old pump station may be converted to a collection system staff facility.

The new station is expected to have a useful life of fifty years, while the equipment is anticipated to last fifteen years.

Project Status and Schedule

The project has four phases: land acquisition, design, construction and resident inspection. Land acquisition negotiations are underway with the MBTA. The land would be jointly acquired by the MWRA and the MDC. The MDC is interested in part of the parcel for parkland. This use will not conflict with construction or operation of the new pump station. Design began in May, 1984 and was completed in August, 1986. A design amendment is now pending to conduct additional soil testing at the site related to possible hazardous wastes. Resident inspection and construction services will begin in March, 1987 and conclude in December, 1989. Construction will begin in July, 1987 and be complete in October, 1989.

The Engineering Division will be reponsible for this project up until the construction contract award. The Construction Division will oversee resident inspection and construction.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	Camp,Dresser.	5355	$656,153	$573,890	$82,263
Constr.	To Be Selected		11,800,000	0	11,800,000
Res.Ins.	To Be Selected		1,000,000	0	1,000,000
Land			500,000	0	500,000
Total			$13,956,153	$573,890	$13,382,263

Authority Share

$1,904,153 (13.6%). The Authority has existing grants for the design, resident inspection and construction phases. Land acquisition costs are not grant eligible.

Current Expense Budget Impact

The annual impact of this project on the Current Expense Budget of the Sewerage Division is expected to be as follows:

Wages	$62,000
Utilities	$41,000
Total	$103,000

Since the new facility will become operational during FY 1990, $77,000 will be required to fund the projected expense in that year. The remaining $26,000 in increased costs will impact the FY 1991 Current Expense Budget.

East Boston Pump Facilities Replacement and Rehabilitation

Description and Justification

The East Boston Pumping System consists of the East Boston Electric Pump Station, Chelsea Screenhouse, Winthrop Terminal Facilities, and East Boston Steam Station. These facilities screen and pump the flows to the Metropolitan Trunk Sewer on the way to the Deer Island Treatment Plant.

The system facilities are old and inefficient, and cannot handle the current sewage flow. The existing Chelsea Screenhouse is inoperable. The Winthrop Terminal Facilities have design deficiencies, equipment problems and operational difficulties. The inadequacy of these facilities contributes to severe sewage backup and flooding in Chelsea, Revere, East Boston and Winthrop.

The project consists of replacement of the Chelsea Screenhouse, the replacement of both the electric and steam stations, rehabilitation of the Winthrop Terminal Facilities and North Metropolitan Trunk Sewer, conversion of the steam station to a maintenance facility, and demolition of the existing electric pump station and screenhouse.

The new Chelsea Screenhouse will screen flows from the Revere Extension Sewer and the Chelsea Branch Sewer as well as excess flows from the Chelsea Creek Headworks. Flow from the Chelsea Screen house will pass through the two existing siphons under Chelsea Creek to the new East Boston Pump Station.

The New East Boston Pump Station will have four 21 mgd and three 50 mgd pumps and will transmit flows from East Boston, Chelsea and Revere through the North Metropolitan Sewer to the Winthrop Terminal Facility. The station will have sufficient capacity to screen and pump both dry and wet weather flows.

The Winthrop Terminal Facility rehabilitation will include three new mechanically cleaned screens, six pumps and drives, grit collection equipment, and upgraded heating, ventilation and air conditioning systems. The rehabilitated facility is intended to remove some of the current burden on the main Deer Island Pump Station and Tunnel System.

The new facilities are expected to have a useful life of forty years for structures and fifteen years for equipment.

Project Status and Schedule

The project has land acquisition, design, resident inspection and five construction phases. The land acquisition process is underway for a parcel in Chelsea for the screenhouse. Design began in January, 1984 and will be completed in January, 1987. The resident inspection and East Boston Pump Station construction

contracts were awarded in July, 1986, and construction is expected to be finished in January, 1989. The Winthrop Terminal Facility construction is anticipated to begin in April, 1987 and be complete in October, 1988. The Chelsea Screen House construction will begin in May, 1987 and is scheduled to be completed in November, 1988. The North Metro Sewer construction will begin in April, 1988 and be completed in April, 1989. The Steam Station construction will begin in April, 1989 and be complete in April, 1990.

The Engineering Division is responsible for all pre-construction phases. The Construction Division will oversee resident inspection and construction.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Land			25,000	0	25,000
Design	Metcalf&Eddy	5360	$2,236,000	$1,214,264	$1,021,736
Res.Ins.	Metcalf&Eddy	5361	2,365,000	0	2,365,000
Con.(E.B.)	O'Connell	5362	18,098,000	0	18,098,000
Con.(W.T)	To Be Selected		4,850,000	0	4,850,000
Con.(Chel)	To Be Selected		5,070,000	0	5,070,000
Con.(S.S.)	To Be Selected		200,000	0	200,000
Con.(MET)	To Be Selected		200,000	0	200,000
Total			$33,044,000	$1,214,264	$31,829,736

Authority Share

$6,506,000 (19.7%). The Authority has existing grants for the design, resident inspection and construction phases. Costs for land acquisition are not grant eligible.

Current Expense Budget Impact

On an anuual basis, the project will impact the Sewerage Division Current Expense Budget as follows:

Wages	$150,000
Utilities	220,000
Services	30,000
Total	$400,000

The Division's FY 1989 budget is expected to increase by approximately $200,000 as the new pump station begins operation. The FY 1990 budget will incorporate the remaining $200,000 cost increase.

Framingham Extension Relief Sewer

Description and Justification

The Framingham Extension Sewer receives wastewater from sections of Framingham, Ashland and Natick and conveys these flows to the Wellesley Extension Sewer for eventual conveyance to the Nut Island Treatment Plant. The sewer was constructed in the 1950s, is six miles long, and has a flow capacity of 17 mgd. This capacity level is no longer adequate to meet demand. Peak flow deficiencies range from 7 to 14 mgd. During heavy rainfalls the sewer becomes surcharged, resulting in overflows in the downstream portions, particularly in the Elm Bank section of the Charles River. These discharges endanger not only the river, but also the Elm Bank Aquifer which will be developed as a water supply in the near future. The Framingham region is expected to have increases in sewered population and continued economic development. Sewered population is expected to increase by 41,000 and peak flows are expected to increase by 11 mgd in the next twenty years. Consequently, a relief sewer is needed to protect environmental resources and to provide additional hydraulic capacity to meet current and future demand.

The project consists of construction of a 20 mgd pump station, approximately 25,000 linear feet of force main, 11,000 linear feet of gravity sewer, and cleaning and lining of the existing Framingham Extension Sewer. The pump station will be an unstaffed facility to be located at the Arthur St. DPW yard in Framingham.

The relief sewer and pump station are expected to have a useful life of forty years. Mechanical equipment is expected to have a useful life of fifteen years.

Project Status and Schedule

To accommodate the flows from Framingham, the Wellesley Extension Relief Sewer must be operational prior to Framingham being activated. In addition, the design of both Wellesley and Framingham may be re-evaluated pending the findings of the South System Modelling project.

Acquisition of the Framingham site for the pump station is being negotiated with the Department of Public Works. Negotiations for easement rights are also underway with Conrail for the pipeline path. Design began in June, 1983 and will be completed in April, 1987. If delays are not encountered in project approval, resident inspection can begin in September, 1988 and be completed in July, 1990. Construction is scheduled to commence in December, 1988 and finish in April, 1990.

The Engineering Division is responsible for this project until award of a construction contract.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Land	Conrail & DPW		$1,000,000	0	$1,000,000
Design	Anderson,Nichols	5318	1,097,937	$477,365	620,572
Res.Ins.	To Be Selected		2,000,000	0	2,000,000
Constr.	To Be Selected		20,000,000	0	20,000,000
Total			$24,097,937	$477,365	$23,620,572

Authority Share

$5,742,937 (23.8%). The Authority has received a grant for the design phase. It is expected that grants for resident inspection and construction will be forthcoming.

Current Expense Budget Impact

The pump station portion of the project is expected to impact the Sewerage Division's Current Expense Budget as follows:

Wages	$19,000
Utilities	25,000
Materials	6,000
Total	$50,000

The pump station will become operational by May in FY 1990, resulting in a cost increase of $8,000 during that year. The reamaining $42,000 will affect the FY 1991 budget.

Hingham Pump Station Rehabilitation

Description and Justification

The Hingham Pump Station is a 3 mgd facility which serves the Hingham Sewer District within the Town of Hingham. The station cannot pump all flow it receives which results in overflows into the Back River. The existing force main has also experienced ruptures, resulting in discharges into the river. The NPDES permit for the Hingham Pump Station requires elimination of the discharges.

The project consists of rehabilitating the pump station including an upgrade to 9 mgd pumping capacity; installation of new electrical, HVAC, and mechanical systems; acquisition of an emergency power generator; addition of office facilities, and construction of a new 20 inch force main. The force main will discharge into the Braintree-Weymouth sewer in Weymouth.

The structures are expected to have a useful life of fifty years. All equipment is expected to have a fifteen year useful life.

Project Status and Schedule

The design work began in July, 1982 and is complete. Resident Inspection will begin in February, 1987 and conclude in January, 1989. Phase one of construction of the force main is complete. Construction of the pump station and the force main crossing of the Back River will begin in May, 1987 and finish in October, 1988.

The Engineering Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	Anderson,Nichols	5371	$423,295	$331,167	$92,128
Res.Ins.	To Be Selected		325,000	0	325,000
Constr.	To Be Selected		1,500,000	0	1,500,000
Total			$2,248,295	$331,167	$1,917,128

Authority Share

$554,295 (24.7%). There are no existing grants. An application for a construction grant has been filed. It is anticipated that the Authority will receive grant awards for resident inspection and construction plus a Federal design allowance.

Current Expense Budget Impact

None.

Millbrook Valley Interceptor Relief Sewer

Description and Justification

The Millbrook Valley Interceptor Sewer serves the Towns of Lexington and Bedford, Hanscom Field and a portion of the Town of Arlington. The interceptor extends from the Arlington town line into Lexington and terminates at the headhouse in Lexington. This 30 inch sewer, together with the 16 inch Lexington interceptor, must accommodate all wastewater flows from the headhouse collection area of Bedford, Hanscom and Lexington.

The Millbrook Valley interceptor lacks sufficient capacity to accommodate peak flows. Inadequate capacity has resulted in surcharging and overflow onto streets, into streams, and backups into homes in Lexington. A relief sewer is required to provide sufficient capacity.

The relief sewer is expected to have a useful life of forty years.

Project Status and Schedule

Design and construction services began in July, 1981, and work was completed in September, 1986. Resident inspection began in August, 1984 and was completed in September, 1986. Construction had two phases, both beginning in September, 1984 and was completed in September, 1986.

The Sewerage Division maintains responsibility for pre-construction phases. The Construction Division oversees the construction phases.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	Weston&Sampson	5325	$595,890	$475,802	$120,088
Res.Ins.	Weston&Sampson	5326	374,655	306,091	68,564
Constr.1	E.E.Cruz	5327	4,547,900	4,232,886	315,014
Constr.2	Harding&Smith	5328	684,750	647,074	37,676
Total			$6,203,195	$5,661,853	$541,342

Authority Share

$993,195 (16%). The Authority has received grants for the design, resident inspection and construction phases.

Current Expense Budget Impact

None.

Reading Pump Station Replacement and Extension Relief Sewer

Description and Justification

The existing Reading Pump Station was constructed in 1920 and receives wastewater flows from Reading and Wakefield through the Reading Extension Sewer. The tributory service population is approximately 20,000 and projected to be 30,000 in the year 2020. The pump station and sewer currently have insufficient capacity, leading to surcharging in both Reading and Wakefield. The pump station also has hazardous working conditions, due to dangerous electrical installation and inadequate heating and ventilation.

This project consists of construction of the 9.4 mgd Allison C. Hayes Pump Station in Wakefield to replace the existing Reading Pump Station, and construction of a relief sewer. The new pump station will include three centrifugal pumps, a standby emergency diesel generator and a mechanical shredder. The pump station will be staffed one shift per day, with automated systems monitored at the Charlestown Pump Station the rest of the time. The relief sewer will include 1,385 linear feet of 36 inch gravity sewer, 2,515 linear feet of 24 inch force main, 205 linear feet of 48 inch jacked sewer crossing Route 128, 620 linear feet of 8 inch gravity sewer, and abandonment of 1,225 feet of existing sewer in the Towns of Reading, Stoneham and Wakefield.

The structural components of the project are expected to have a useful life of forty years. Equipment is projected to have a useful life of fifteen years.

Project Status and Schedule

The design for the project is complete. The design contract included construction services which will be completed in April, 1987. Resident inspection began in May, 1985 and will conclude in April, 1987. The pump station construction phase began in June, 1985 and will be completed by December, 1986. The relief sewer construction phase began in May, 1985 and is scheduled for completion in April, 1987.

The Engineering Division is responsible for all pre-construction phases of this project. The Construction Division will oversee the resident inspection and construction phases.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	SEA Consult.	5335	$461,681	$348,045	$113,636
Res.Ins.	SEA Consult.	5336	313,129	208,772	104,357
Con.(P.S.)	Gioioso & Sons	5337	2,214,777	1,221,401	993,376
Con.(R.S.)	P. Caliacco	5338	2,034,935	1,569,674	465,261
Total			$5,024,522	$3,347,892	$1,676,630

Authority Share

$4,730,522 (94.1%). The Authority has received a grant award for the design phase. No construction grants are anticipated.

Current Expense Budget Impact

The FY 1987 Current Expense Budget for the Sewerage Division includes funding for operation of the new Allison C. Hayes Pump Station.

Slade's Siphons

Description and Justification

Slade's Siphons were built in 1894 and convey sewage flows from Revere under the Mill Creek to Chelsea, where they are transported to the Deer Island Treatment Plant via the Chelsea Headworks. The walls and roof of the existing headhouses (inlet and outlet chambers) are severely corroded from the actions of corrosive sewage, tidal pounding, salt spray and freezing/thawing cycles. The structures have deteriorated to the point where they are no longer structurally sound. The danger of collapse is imminent. Should such an event occur, blockage of the siphon tubes is probable, with a subsequent backup of sewage into Revere and the Mill Creek. Removal of the obstruction would be severely hampered by the present inaccessibility of the headhouses.

To restore the structural integrity of the headhouses and to allow easy access for maintenance, this project consists of slip-lining 250 linear feet of the existing twin barrel siphon, rebuilding the headhouses and possibly constructing an access road for MWRA vehicles.

The rebuilt headhouses and rehabilitated siphons are expected to have a useful life of forty years.

Project Status and Schedule

Design began in November, 1983 and will be complete in October, 1986. This phase will be fully complete when an Army Corps of Engineers permit is secured for construction of the siphons. Resident inspection is expected to begin in April, 1987. Construction is scheduled to begin in June, 1987 and be completed in June, 1988.

The Engineering Division will be responsible for this project up to construction contract award. The Construction Division will oversee resident inspection and construction.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	Gannett,Flemming	5425	$88,065	$57,000	$31,065
Res.Ins.	To Be Selected		50,000	0	50,000
Constr.	To Be Selected		500,000	0	500,000
Total			$638,065	$57,000	$581,065

Authority Share

$638,065 (100%).

Current Expense Budget Impact

None.

Wellesley Extension Replacement Sewer

Description and Justification

The Wellesley Extension Sewer serves Needham, most of Wellesley and part of Dedham. Wellesley Extension is also the connection for the Framingham Extension Relief Sewer. The existing sewer consists of 24 and 36 inch pipeline which is unable to convey all flows, particularly at peak periods. Excess flows result in surcharging and overflows into the Charles River and in parts of Dedham, Needham, Wellesley, Dover and Natick. Sewage spillage endangers two water supplies: the Needham town wells and the Elm Bank Aquifer.

The project consists of constuction of a replacement sewer including 35,000 linear feet of 54 and 60 inch pipeline with a limited amount of 8 inch pipe for collection of wastewater from Dedham and Needham, pipe crossings at the Charles River and Route 128, and a half mile of tunneling in Dedham.

The new sewer is expected to have a useful life of fifty years.

Project Status and Schedule

The first phase of the project combines design and an environmental impact report. Design is thirty percent complete. The EIR is substantially complete. Both design and the EIR are anticipated to be complete in June, 1987. Land easements are required to gain access to the pipeline path and are scheduled to be acquired by July, 1987. The land costs will also include mitigation expense for a business which will be displaced for the two year construction period. Construction services and resident inspection are expected to begin in December, 1987 and conclude in July, 1990. Construction is scheduled to begin in June, 1988 and finish in July, 1990.

The Engineering Division is responsible for this project up to construction contract award. The Construction Division will oversee all construction and construction services.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Des./EIR	SEA Consult.	5346	$1,183,737	$621,211	$562,526
Land Acq.			2,000,000	0	2,000,000
Con.Ser.	To Be Selected		1,500,000	0	1,500,000
Constr.	To Be Selected		31,000,000	0	31,000,000
Total			$35,683,737	$621,211	$35,062,526

Authority Share

$5,478,737 (15.5%). The Authority has received facilities planning and design grants. It is anticipated that future grants will be received for the construction services and construction phases.

Current Expense Budget Impact

None.

South Maintenance Facility

Description and Justification

The old Sewerage Division South Maintenance Yard was transferred in 1974 to the Board of Trustees of Boston State College by act of the Massachusetts Legislature. The personnel and equipment formerly housed at the old location have been moved to the Division's North Maintenance Facility in East Boston. This location is inefficient as an operations center for the sewer line maintenance crews for the South System.

The Sewerage Division has obtained 2.8 acres of land in Roslindale which is suitable for a new maintenance facility. The project will consist of construction of a maintenance yard for vehicle storage and a building to include personnel facilities and storage for equipment and materials.

The South Maintenance Facility is expected to have a useful life of thirty years.

Project Status and Schedule

The design for the building began in July, 1983 and is complete. Resident inspection and construction phases are scheduled to begin in July, 1987 and be completed by July, 1988.

The Sewerage Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	Lears & Assc.	5378	$50,000	0	$50,000
Res.Ins.	To Be Selected		100,000	0	100,000
Constr.	To Be Selected		2,400,000	0	2,400,000
Total			$2,550,000	0	$2,550,000

Authority Share

$2,550,000 (100%).

Current Expense Budget Impact

The annual impact of the new facility on the Sewerage Division's Current Expense Budget is as follows:

Utilities	$50,000
Maintenance	10,000
Total	$60,000

The impact is expected in FY89 when the new facility becomes operational.

New Neponset Valley Relief Sewer

Description and Justification

The New Neponset Valley Interceptor sewer system consists of the New Neponset Valley Sewer, the Westwood Extension Sewer, Walpole Extension Sewer and Stoughton Extension Sewer. The system serves Walpole, Stoughton, Canton, Norwood, Milton and Westwood. Downstream of the New Neponset Valley Sewer System is the High Level Sewer which conveys sewage flows to the Nut Island Treatment Plant.

There are two major problems concerning the interceptor system, current system deficiencies and future service population growth. The existing sewer lines have both structural and hydraulic deficiencies. The New Neponset Valley Sewer has a 6 mgd deficiency at its downstream segment. More severe deficiencies, on the order of 22 mgd, occur at several upsteam segments. Such inadequacies cause sewage to surcharge and overflow to ground surfaces and adjacent water bodies such as the Neponset River. The overflows, combined with other pollution sources, threaten the Neponset River Watershed which is the water supply for Canton and the Dedham Water Company.

The current service population is 74,000 which is anticipated to increase to 144,000 in the year 2030. This service increase is due primarily to the conversion from septic tanks to sewer service in the Towns of Canton, Stoughton, Walpole and Westwood. To accommodate the expected increase in sewage flows, relief facilities are required.

This project consists of construction of relief sewers for the Authority's Stoughton and Walpole Extension Sewers and the New Neponset Valley Sewer. The relief sewers would serve the towns of Stoughton, Canton, Walpole, Norwood, Westwood, and part of Dedham, Hyde Park and Milton. The relief sewer includes 46,000 linear feet of 24 to 66 inch pipeline to be located adjacent to existing lines except for two minor areas in Canton. The sewer will be a gravity feed system. Project implementation is contingent upon the ability of the High Level Sewer to accept the additional flow.

The relief sewers are expected to have a useful life of forty years.

Project Status and Schedule

The facilities planning for the project began in April, 1983, and a draft plan is complete. An environmental impact report is required and will be combined with preliminary design into one project phase. The EIR and design work begins in February, 1987 and is scheduled to be completed in August, 1987. A second contract for final design is expected to begin in February, 1988 and finish in December, 1988. The project requires easements on

land which must be secured by September, 1988. Construction services will begin in April, 1989 and continue until the end of the construction phase. Construction is scheduled to begin in July, 1989 and be completed in June, 1991.

The Engineering Division is responsible for this project up until construction contract award. The Construction Division will oversee construction and construction services.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Fac.Plan.	LEA, Inc.	5380	$568,162	$473,976	$94,186
EIR	To Be Selected		700,000	0	700,000
Design	To Be Selected		800,000	0	800,000
Land			500,000	0	500,000
Con.Ser.	To Be Selected		1,000,000	0	1,000,000
Constr.	To Be Selected		25,000,000	0	25,000,000
Total			$28,568,162	$473,976	$28,094,186

Authority Share

$3,386,162 (11.9%). The Authority has received a grant for the facilities planning and design phases. Land costs are not grant eligible. It is anticipated that grants will be received for the EIR, construction services and construction phases.

Current Expense Budget Impact

None.

Quincy Pump Facilities Study

Description and Justification

The Quincy Pump Facilities include the Quincy Pump Station, the Hough's Neck Lift Station, the Squantum Pump Station, and the Squantum Force Main. These facilities serve the City of Quincy and pump sewage flows to the High Level Sewer for conveyance to the Nut Island Treatment Plant.

Quincy Pump Station is a 52 mgd facility which has been in operation for 83 years. Hough's Neck Lift Station is a 2.8 mgd facility which has 43 years of continuous service. The Squantum Pump Station is a 8 mgd facility which has operated for 48 years. The Squantum Force Main is a one mile, 16 inch pipeline which is fifteen years old. Each of these facilities is beyond its useful life and is prone to failure. The force main is corroded due to lack of protection from salt water in the sections where the pipeline crosses marshland and Wollaston Beach. In 1976, the EMMA study recommended that substantial improvements be initiated for all Quincy facilities. The recommendations have not been acted on to date.

The project consists of facilities planning and design. Facilities planning will assess the current and future service requirements, generation of alternatives for service delivery, estimation of capital costs, and recommendation of a plan. An EIR, if necessary, will be undertaken concurrent with facilities planning. Design work may be initiated during the planning phase if critical improvements are deemed necessary from the preliminary assessment.

Project Status and Schedule

The facilities planning phase will begin in March, 1987 and will be completed in October, 1988. If design work must be expedited, the design phase may begin in January, 1988. Final design for the entire project would be completed by December, 1990.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Fac.Plan.	To Be Selected		$750,000	0	$750,000

Authority Share

$150,000 (20%). It is anticipated that the Authority will receive a grant for the facilities planning phase.

Current Expense Budget Impact

None.

North Charles Metro Relief Sewer

Description and Justification

The North Charles Metro Sewer is experiencing surcharging and overflows into the Charles River due to insufficient hydraulic capacity. The project consists of facilities planning to determine the current and future flows and to recommend relief or replacement alternatives.

Project Status and Schedule

Facilities planning is scheduled to begin in May, 1988 and continue for fifteen months. Future phases of the project will be identified when the planning alternatives have been evaluated.

The Engineering Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Fac.Plan.	To Be Selected		$500,000	0	$500,000

Authority Share

$95,000 (19%). It is anticipated that the Authority will receive a facilities planning grant.

Current Expense Budget Impact

None.

Wakefield Branch and Trunk Sewers

Description and Justification

The Wakefield Branch and Trunk Sewers discharge to the Malden Relief Sewer for initial treatment at the Chelsea Creek Headworks. The Wakefield area has been subject to surcharging and overflows due to flows in excess of system capacity. Surcharging is due to the Branch and Trunk Sewers lack of capacity required to deliver the flows. In order to solve the overflow problem, relief alternatives must be explored.

The project consists of facilities planning to assess existing and projected service requirements, estimate costs and recommend a plan.

Project Status and Schedule

Facilities planning is scheduled to begin in May, 1988 and will continue for fifteen months. Future phases may be required depending on the evaluation of the planning recommendations.

The Engineering Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Fac.Plan.	To Be Selected		$500,000	0	$500,000

Authority Share

$95,000 (19%). It is anticipated that the Authority will receive a facilities planning grant.

Current Expense Budget Impact

None.

Watertown Siphon Reconstruction

Description and Justification

The Watertown Siphon carries sewage flows from the Town of Watertown under the Charles River to the South Charles Relief Sewer. The Town of Watertown is undertaking improvements to its local sewer system along the Charles River. As part of its construction program, the Town has proposed to perform repairs to the MWRA's Watertown Siphon headhouses. The work would be performed under a contract with the Town of Watertown whereby the Authority will reimburse the Town for its share of costs associated with the siphon construction.

Project Status and Schedule

Construction is scheduled to begin in June, 1987 and will conclude in April, 1988.

The Sewerage Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Constr.	Watertown		$379,965	0	$379,965

Authority Share

$379,965 (100)%. Watertown has received a grant for this project which includes $158,365 for the repair of the headhouses. The total cost listed above reflects only the remaining MWRA share after these grant receipts have been incorporated.

Current Expense Budget Impact

None.

Southern System Modeling

Description and Justification

The Division of Water Pollution Control has determined that prior to granting approvals necessary to proceed with construction of relief projects in the MWRA's southern interceptor system, the Authority must demonstrate that the High Level Sewer has the capacity to accept additional flow. To assess the capacity question, the Authority has initiated the Southern System Modelling project. This project consists of development of a dynamic hydraulic flow model, purchase and installation of meters, collection and analysis of actual flow data and assessment of the performance of the High Level Sewer under existing and future hydraulic conditions including introduction of relief sewer flows.

The project includes installation of 24 temporary and 11 permanent flow meters. Telemetry equipment and computers are included to provide for centralized data collection. The project also includes installation of a number of rain gauges and groundwater observation wells. The data collected from the gauges and wells will be correlated with flow level data from the sewer system to determine the effect of influent rainfall on system flows.

All equipment purchased for the project will revert to Authority ownership. The equipment is expected to have a useful life of ten years.

Project Status and Schedule

The project has one study phase which began in February, 1986. The study is expected to be completed in August, 1987.

The Engineering Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	Metcalf&Eddy	5396	$2,283,934	$82,738	$2,201,196

Authority Share

$330,934 (14.5%). The Authority has received a grant for the study phase.

Current Expense Budget Impact

None.

Belle Isle Siphon Rehabilitation

Description and Justification

The Belle Isle Siphon carries flows from East Boston to Winthrop under the Belle Isle Marsh. It is a triple barrel siphon with 54 inch pipes. One pipe is completely blocked. The two active pipes are a source of salt water infiltration due to corrosion. The headhouses are also in disrepair. The siphon and headhouses require rehabilitation to carry existing flows, reduce infiltraton, and increase capacity to accommodate greater flows when the East Boston Pump Station becomes operational in 1989.

The project consists of cleaning and relining the three siphon pipes, resealing the siphon to prevent salt water inflow and rebuilding the headhouses.

The rehabilitated siphon is expected to have a useful life of forty years.

Project Status and Schedule

The design phase began in August, 1983 and is complete. Construction is scheduled to begin in July, 1987 and be completed in July, 1988. Resident inspection will begin in June, 1987 and finish in July, 1988.

The Sewerage Division will be responsible for this project up to the construction contract award. The Construction Division will oversee resident inspection and construction.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	Fay,Spoff.&Thorn.	5305	$49,000	$37,907	$11,093
Res.Ins.	To Be Selected		80,000	0	80,000
Constr.	To Be Selected		950,000	0	950,000
Total			$1,079,000	$37,907	$1,041,093

Authority Share

$1,079,000 (100%).

Current Expense Budget Impact

None.

Deer Island Sewer System Evaluation and Rehabilitation

Description and Justification

In 1982, Camp, Dresser and McKee completed the Deer Island Service Area Physical Survey and Flow Isolation Study for the Metropolitan District Commission. The study identified infiltration and inflow (I/I) volumes for the Deer Island interceptor system and recommended inspection, cleaning and rehabilitation programs to correct the I/I problem.

This project has study, design and construction phases necessary to implement the recommended I/I reduction program for the north interceptor system. The project consists of inspection and rehabilitation of MWRA interceptors in Brighton, Cambridge, Melrose and Newton. Inspection and rehabilitation involves hydraulic cleaning, sliplining, spot repairs and manhole renovation. The project will cover 13,000 linear feet of interceptor sewer.

Project Status and Schedule

Study, design and construction services are combined into one project phase. The scope of services for this phase is currently under review. Construction is scheduled to begin December, 1988 and be completed in one year.

The Engineering Division is responsible for this project until a construction contract is awarded.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study/Des.	Weston&Sampson	5392	$350,000	0	$350,000
Constr.	To Be Selected		450,000	0	450,000
Total			$800,000	0	$800,000

Authority Share

$120,000 (15%). It is anticipated that the Authority will receive grants for the study, design and construction phases.

Current Expense Budget Impact

None.

Sewerage System Metering

Description and Justification

The current basis for annual recovery of costs of sewage service provides for assessment for service in proportion to population and population equivalents. This method does not adequately provide for recognition of variation among communities in sewage discharges or in infiltration/inflow (I/I) and stormwater flows.

The use of flow metering to determine sewage discharge was recommended to the Authority in a report entitled Alternative Cost Recovery Methods and Mechanisms for Encouraging Discharge Reduction. The metering program would enable the Authority to detect changes in total sewage discharge from a community as local improvements to reduce non-point discharges are made. Reduced flows would result in lower assessments and thus encourage local sewage system I/I improvements.

The project involves the study, design and construction of a metering system for measuring the flow of sewage from each of the 43 MWRA served communities. The metering project will have two stages. The initial part of the project will result in the installation of approximately 140 meters to measure approximately 90% of the total flow. This initial metering will form the basis for evaluating the methods, desirability and cost of more fully metering the system. The intent is to ensure that this stage could be substantially integrated into a full metering system. The initial study phase includes selection of optimum locations for meters and evaluation of available meter and telemetry systems. Design and construction phases will follow. The second study phase will evaluate the initial metering system and plan for implementation of full metering.

The equipment is expected to have a ten year useful life. Structures housing the equipment are expected to have a twenty five year life.

Project Status and Schedule

The initial study phase is scheduled to begin in March, 1987 and will last ten months. Design is expected to begin in January, 1988 and be completed in May, 1988. Construction will begin in September, 1988 and finish in March, 1989. The second study phase will begin in June, 1989 and last three months.

The Engineering Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study I	To Be Selected		$300,000	0	$300,000
Study II	To Be Selected		300,000	0	300,000
Design	To Be Selected		200,000	0	200,000
Constr.	To Be Selected		2,000,000	0	2,000,000
Total			$2,800,000	0	$2,800,000

Authority Share

$675,000 (24%). It is anticipated that the Authority will receive grants for the eligible cost of the design, construction and second study phases.

Current Expense Budget Impact

The impact on the Current Expense Budget is estimated to be $600,000 per year for maintenance and data processing services beginning in FY 1990.

WASTEWATER TREATMENT

Deer Island Pump and Power Station Upgrading

Description and Justification

The Pump and Power Station delivers sewage flow from the Deer Island Tunnel System to the Treatment Plant. The upgrade is a component of the Deer Island "Fast Track" program and is critical to the harbor clean-up effort since failure of the pump station results in surcharges and overflows in the upstream sewer system.

The project involves rehabilitation of the pump station including the replacement of five raw sewage pumps and the addition of four 2000 horsepower electric motors and two 6,000 kilowatt diesel engine generators. The project also includes construction of a closed loop potable water cooling system, the rehabilitation of the Non-Potable Water Pump Station with new screens, piping and strainers, and the installation of a new control room complete with electrical, heating, ventilating and air conditioning improvements.

The equipment is expected to have a useful life of fifteen years.

Project Status and Schedule

Design of the project was completed in February, 1986. Construction services began in February, 1986 and will end in June, 1990. Construction began in June, 1986 and is expected to be completed in March, 1990.

The Construction Division is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	Havens&Emerson	5451	$2,026,575	$1,747,879	$278,696
Con.Ser.	Havens&Emerson	5453	2,620,000	0	2,620,000
Constr.	Peabody N.E.	5452	25,399,465	0	25,399,465
Totals			$30,046,040	$1,747,879	$28,298,161

Authority Share

$3,857,040 (12.8%). The Authority has recieved grants for the design, construction services and construction phases.

Current Expense Budget Impact

None.

Deer Island Chlorination Facility Rehabilitation

Description and Justification

The Deer Island Chlorination Facility provides disinfection of the treatment plant effluent. The existing facility is almost twenty years old and is at the end of its useful life. The equipment is unreliable and presents a serious safety hazard for plant personnel, the Deer Island Prison population and the Town of Winthrop.

The project is part of the Deer Island "Fast Track" program and consists of upgrading process equipment, scales, chlorinators, evaporators, piping, instrumentation, and electrical, HVAC, and safety systems. The project will include a building addition to house a scrubber system which will contain any chlorine leaks.

The new equipment is expected to have a useful life of ten years.

Project Status and Schedule

Project design began in June, 1985 and was completed in August, 1986. Resident Inspection is scheduled to begin in February, 1987 and finish in October, 1988. Construction is expected to start in March, 1987 and be completed in August, 1988.

The Engineering Division is responsible for this project up to construction contract award. The Construction Division will oversee the resident inspection and construction.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	Hayden,Wegman	5460	$167,946	$151,135	$16,811
Res.Ins.	To Be Selected		190,000	0	190,000
Constr.	To Be Selected		2,200,000	0	2,200,000
Totals			$2,557,946	$151,135	$2,406,811

Authority Share

$474,946 (18.6%). The Authority has received grant awards for the design, resident inspection and construction phases.

Current Expense Budget Impact

None.

Deer Island Sludge Thickeners Rebuilding

Description and Justification

The are four sludge thickeners at the Deer Island Treatment Plant. At the start of this project two of the thickeners were out of service and required repair and rebuilding. Since the thickeners are essential to efficient operation of the plant disgesters, the rebuilding program has been included in the Deer Island "Fast Track" program.

The project consists of the replacement of sludge collection mechanisms, electrical equipment, railing, piping and needed auxilliaries. The project will also include reconstruction of the thickener overflow to allow effluent on the discharge side of the weir plates to enter the overflow piping.

The equipment is expected to have a useful life of fifteen years.

Project Status and Schedule

Design work for the major rebuilding phase began in May, 1983 and was completed in June, 1985. Construction started in April, 1985 and will be completed in December, 1986. Design of the overflow is scheduled to begin in February, 1987. Construction is expected to begin in July, 1987 and be completed in December, 1987.

The Construction Division is responsible for oversight of the construction phase. The Sewerage Division will be responsible for the remaining overflow phases.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Constr.	Peabody N.E.	5491	$1,487,000	$573,705	$913,295
Des.2	To be Selected		20,000	0	20,000
Constr.2	To be Selected		75,000	0	75,000
Total			$1,582,000	$573,705	$1,008,295

Authority Share

$232,000 (14.7%). The Authority has received a grant for the first construction phase.

Current Expense Budget Impact

None.

Deer Island Digester Rehabilitation

Description and Justification

There are four digesters at the Deer Island Treatment Plant. The purpose of the digesters is to reduce the volatile portion of the solids which have been removed from the incoming sewage in the sedimentation basins. The temperatures inside the digesters and the acidity of the contents also destroy pathogenic bacteria common to the sewage.

The digesters produce methane gas which is utilized by the plant as a fuel supplement to provide heat for the digesters and to power the electric generators. The digesters have been out of service resulting in lower gas production and the need to purchase diesel fuel to replace the methane.

This project consists of rehabilitation and repair of the roofs of digesters 1, 2, 3 and 4 to restore them to operable condition.

The roofs are expected to have a useful life of fifteen years.

Project Status and Schedule

Design is complete. There are two construction contracts, both of which are scheduled for completion in October, 1986.

The Construction Division is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	O'Brien&Gere	5500	$403,773	$389,087	$14,686
Constr.1	Peabody N.E.	5501	$3,911,910	3,416,300	495,610
Constr.2	Peabody N.E.	5502	3,453,185	2,912,236	540,949
Total			$7,768,868	$6,717,623	$1,051,245

Authority Share

$7,768,868 (100%).

Current Expense Budget Impact

Reduced diesel fuel use has been anticipated in the FY87 Current Expense Budget.

Deer Island Electrical Equipment Upgrade

Description and Justification

The Deer Island Treatment Plant generates and distributes all the electricity it requires and does not have a tie-in with an electrical power company. The treatment plant has a maximum generating capacity of 3,500 kilowatts. At times, only two engines and alternators have been on line producing 1,400 kilowatts, which is the absolute minimum required to run the plant. Failure of an additional piece of equipment would result in a shut down of the operation of the treatment plant.

The condition of all components of the electrical system has deteriorated from overuse, chlorine and hydrogen sulfide exposure, salt spray, dampness and insufficient numbers of qualified technical maintenance staff.

The project will restore all components of the power generation and distribution system, except the diesel engines, to optimum condition. The project is part of the Deer Island "Fast Track" program.

The electrical equipment is expected to have a useful life of fifteen years.

Project Status and Schedule

Design began in July, 1984 and is complete. Resident Inspection and construction began in July, 1986 and is scheduled for completion in December, 1987.

The Construction Division is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	Alonzo Reed	5510	$196,000	$168,445	$27,555
Res.Ins.	Alonzo Reed	5512	241,635	0	241,635
Constr.	Chappy	5513	$1,749,449	0	$1,749,449
Total			$2,187,084	$168,445	$2,018,639

Authority Share

$274,084 (12.5%). The Authority has received grant awards for the design, resident inspection and construction phases.

Current Expense Budget Impact

None.

Deer Island Sedimentation Tank System Improvements

Description and Justification

The Deer Island Treatment Plant was constructed in 1968. The existing sedimentation tank equipment is now sixteen years old and at the end of its useful life. The tanks are currently in poor operating condition. The inlet gates and baffles are difficult to operate, and some gates cannot be completely closed. The sludge withdrawal pump valves are either unreliable or inoperable. The scum collection system is not operating efficiently since the collection mechanisms were damaged several years ago when scum build-ups in the collection troughs froze and bent the collection equipment.

The project consists of replacement of 80 inlet sluice gates and baffles, construction of three new warming stations, renovation of the gate control building and installation of new scum collection and pump systems. The project is part of the Deer Island "Fast Track" program.

The new equipment is expected to have a useful life of fifteen years.

Project Status and Schedule

Design work began in June, 1985 and is scheduled to be completed in October, 1986. The design contract includes construction administration services. Resident inspection is expected to begin in March, 1987 and conclude in November, 1989. Construction is anticipated to begin in April, 1987 and finish in August, 1989.

The Engineering Division is responsible for this project up until construction contract award. The Construction Division will oversee construction services, resident inspection and construction.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	Beta Eng.	5471	$379,480	$163,722	$215,758
Res.Ins.	To Be Selected		680,000	0	680,000
Constr.	To Be Selected		11,330,000	0	11,330,000
Total			$12,389,480	$163,722	$12,225,758

Authority Share

$1,513,480 (12.2%). It is anticipated that the Authority will receive grant awards for the design, resident inspection and construction phases.

Current Expense Budget Impact

The grit removal facility is expected to have the following annual impact on the Sewerage Division Current Expense Budget.

Wages	$60,000
Overtime	24,000
Chemicals	2,500
Utilities	2,000
Total	$88,500

The impact is anticipated in FY 1990.

Deer Island Remote Headworks Improvements

Description and Justification

The Deer Island headworks are located at Chelsea Creek in Chelsea, Columbus Park in South Boston and Ward Street in Roxbury. These facilities provide pre-treatment of raw sewage prior to its entering the Deer Island tunnel system. The existing headworks equipment is deteriorated due to age and operating conditions. The sluice gate operating equipment no longer maintains the gates in an open position, requiring that operating staff prop the gates open with logs. Grit collection and screening equipment is frequently out of service. This equipment failure reduces the headworks capacity which leads to surcharging and overflow in wet weather conditions. The equipment must also be replaced in order to protect the transfer tunnels and the Deer Island Pump Station.

The project consists of rehabilitation of the sluice gates, replacement of screens and grit collection equipment and installation of odor control systems. This project is part of the Deer Island "Fast Track" program.

The equipment is expected to have a useful life of fifteen years.

Project Status and Schedule

Design work began in May, 1985 and is scheduled for completion in February, 1987. Resident inspection is expected to begin in March, 1987 and conclude in February, 1989. Construction will begin in May, 1987 and finish in December, 1988.

The Engineering Division is responsible for this project up until construction contract award. The Construction Division will oversee resident inspection and construction.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	Anderson,Nichols	5470	$823,067	$519,082	$303,985
Res.Ins.	To Be Selected		1,271,970	0	1,271,970
Constr.	To Be Selected		19,400,000	0	19,400,000
Totals			$21,495,037	$519,082	$20,975,955

Authority Share

$3,136,037 (14.6%). The Authority has received grant awards for the design, resident inspection and construction phases.

Current Expense Budget Impact

None.

Nut Island Immediate Upgrading

Description and Justification

The Nut Island Treatment Plant began operations in 1951. The plant has continued operating with much of the original machinery and equipment. The Immediate Upgrading has been undertaken to rehabilitate the plant facilities and replace outdated machinery and equipment. The upgrading includes overhaul and rebuilding of the diesel engines, installation of ventilation and odor control systems for the main building, replacement of the grit room electrical systems, purchase of new treatment process equipment, rehabilitation of the sedimentation tanks and cleaning of the outfalls. Site improvements and new personnel facilities are also planned.

The new facilities and equipment are expected to have a useful life of ten years.

Project Status and Schedule

The planning phase consisted of the Site Options Study and evaluation of the immediate needs of the plant. Planning and preliminary design began in 1980 and were completed in 1983. This initial contract is scheduled to be closed out in December, 1986.

The first design contract includes design and construction services for all construction phases except landscaping and also includes resident inspection for the construction of the personnel facilites. This phase began in January, 1983 and will conclude in May, 1988.

The second design phase is for site improvements. Design will begin in April, 1987 and conclude in July, 1987.

The first construction phase covers the engine overhaul and rebuilding. This contract was completed in March, 1985.

The second construction contract consists of the ventilation and odor control work which began in February, 1984 and is scheduled to finish in December, 1986.

The third phase of construction is the electrical improvements to the grit room. The construction began in February, 1984 and is expected to be completed in December, 1986.

The fourth construction phase is purchase and installation of the process equipment. This phase began in March, 1984 and will be complete in November, 1986.

The fifth phase of construction is the sedimentation tank improvements. Work began in August, 1984 and was completed in August, 1986.

The sixth construction contract is for site improvements. It is anticipated that construction will begin in August, 1987 and be compeleted in February, 1988.

The seventh construction phase is for personnel facilities. It is anticipated that construction will begin in July, 1987 and be completed in August, 1988.

The final construction phase is the cleaning of the outfalls. The cleaning began in September, 1985 and is completed.

The Sewerage Division is responsible for all phases of this project including construction services, resident inspection and construction.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Fac.Plan.	Metcalf&Eddy	5560	$1,454,094	$1,303,414	$150,680
Des.1	Metcalf&Eddy	5561	1,192,971	893,191	299,780
Des.2	To Be Selected		60,000	0	60,000
Constr.2	J.McCabe	5563	913,186	805,337	107,849
Constr.3	Chappy	5564	298,822	243,815	55,007
Constr.4	Gaffney	5565	897,485	701,161	196,324
Constr.5	R.Zoppo	5566	3,063,010	3,013,693	49,317
Constr.6	To Be Selected		500,000	0	500,000
Constr.7	To Be Selected		2,500,000	0	2,500,000
Constr.8	J.F.White	5586	1,083,774	1,073,744	10,030
			$11,963,342	$8,034,355	$3,928,987

Authority Share

$6,371,342 (53.3%). The Authority has received grant awards for eligible costs associated with the upgrading project.

Current Expense Budget Impact

None.

Deer Island Microwave Equipment Replacement

Description and Justification

The Deer Island microwave communications system links the remote headworks at Chelsea Creek, Ward Street and Columbus Park with the Deer Island Pumping Station. The system transmits flow and shaft level information from each headworks to the Pump Station control room. The flow and level data are used to set the pace of the Deer Island pumps.

The existing equipment requires replacement since the manufacturer and maintenance contractor have stated that they can no longer maintain the system due to the lack of personnel experienced with the older equipment. Attempts to find other maintenance companies able to service the system were not fruitful. The equipment is simply too old and outdated.

The project consists of removal and disposal of the existing multiplex and microwave receiving and transmitting equipment at Deer Island and the headworks; installation of new multiplex and microwave equipment, cables and antennas at all four sites, and staff training in maintenance and use of the new system.

The equipment is expected to have a useful life of twenty years.

Project Status and Schedule

Design of the new system was completed in October, 1985. Construction began in November, 1985 and will be completed in November, 1986.

The Sewerage Division is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Constr.	Lynnwell Assc.	5545	$235,000	$16,150	$218,850

Authority Share

$235,000 (100%).

Current Expense Budget Impact

None.

Deer Island Primary and Secondary Treatment Facilities

Description and Justification

The Federal Clean Water Act requires secondary treatment of the Authority's wastewater. Secondary treatment consists of a biochemical and physical process which removes 85% to 90% of the suspended and organic materials in the wastewater.

Currently, the Authority has only primary treatment facilities. In order to comply with Federal law, the MWRA has initiated planning for secondary treatment of all wastewater flows. On July 10, 1985, the MWRA Board of Directors approved Deer Island as the preferred location for a new secondary treatment facility.

The commitment to build a single secondary facility to accommodate flows from both the North and South Collection Systems necessitates reconfiguration of the Authority's current treatment system. The existing primary plant on Deer Island will be replaced with a new secondary facility. New outfalls for the secondary plant will replace the existing primary plant outfalls. The Nut Island Treatment Plant will be phased out and replaced with a five mile cross-harbor tunnel to convey the flows from the South Collection System to Deer Island. The Nut Island facility will be converted to a headworks.

The new treatment facilities and tunnel are expected to have a useful life of fifty years. The useful life for plant equipment is expected to be twenty years.

Project Status and Schedule

The project will have eight pre-construction phases. The first phase is facilities planning which began in May, 1986 and is scheduled to be completed in November, 1988. The project will require an environmental impact report. This phase is scheduled to begin in January, 1987 and conclude in November, 1988.

There will be six design phases. The initial phase is site development design. This phase is anticipated to begin in May, 1988 and be completed in June, 1989. Phase two, design for the new primary plant, is expected to begin in November, 1988 and finish in April, 1990. Phase three, secondary facilities design, will begin in May, 1989 and end in April, 1991. Phase four, design for the outfalls, is scheduled to begin in March, 1989 and be completed in November, 1990. Phase five, harbor tunnel design, will begin in March, 1989 and be completed in August, 1990. Phase six, design of the Nut Island conversion, is expected to begin in March, 1989 and be finished in June, 1990.

Construction will follow completion of design work. The specific phases and schedules for construction will be established as facilities planning and preliminary design are accomplished.

The Engineering Division is responsible for this project up until construction contract award. The Construction Division will oversee all construction phases.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Fac.Plan	Camp, Dresser	5526	$4,757,285	0	$4,757,285
EIR	To Be Selected		3,700,000	0	3,700,000
Des.1	To Be Selected		1,100,000	0	1,100,000
Des.2	To Be Selected		37,000,000	0	37,000,000
Des.3	To Be Selected		52,000,000	0	52,000,000
Des.4	To Be Selected		4,800,000	0	4,800,000
Des.5	To Be Selected		8,000,000	0	8,000,000
Des.6	To Be Selected		1,600,000	0	1,600,000
Total			$112,957,285	0	$112,957,285

Authority Share

$15,289,285 (13.5%). It is anticipated that the Authority will receive grants for the facilities planning and design phases. EIR work may be grant eligible.

Current Expense Budget Impact

The impact on the Sewerage Division's Current Expense Budget is not expected until the beginning of 1995 when the new facilities are scheduled to begin operations. In current dollars, the impact is expected to be $26 million for increased labor, utility and other operating costs.

Water Transportation Facilities

Description and Justification

The construction of "Fast Track" improvements and new primary and secondary treatment facilities at Deer Island and the conversion of the Nut Island Treatment Plant to a headworks facility require the largest concentrated construction program ever undertaken by a Massachusetts public authority. Since land access to these sites is limited, the construction program would have a major adverse impact on the Town of Winthrop and the City of Quincy.

In an effort to mitigate the impacts of construction crew and vehicle transport, the Authority is proposing to build/acquire water transportation facilities which will permit construction materials, equipment and personnel to move to and from the construction sites without travelling through the adjacent communities.

The transportation facilities include both on-shore and on-island piers. The piers would allow not only construction materials and equipment to be transported from the mainland to the islands, but operational staff and supplies as well.

The project consists of facilities planning, design and construction of on-shore and on-island piers. The piers will have concrete decks and open pile construction. The cost estimate does not include potential real estate acquisition or lease costs.

The transportation facilities are expected to have a useful life of twenty years.

Project Status and Schedule

Facilities planning and an environmental impact report are combined into one project phase. This phase began in February, 1986 and is scheduled for completion in April, 1987. The draft EIR is expected in October, 1986 and the facilities plan is due in January, 1987.

Design is anticipated to begin in April, 1987 and be completed in December, 1987. Resident inspection will begin in March, 1988 and conclude in May, 1990. The construction phase for the on-island piers is expected to begin in August, 1988 and finish in September, 1989. Construction of the on-shore pier will begin in September, 1988 and will be completed in May, 1990.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Fac.Plan/ EIR	C.E.Maguire	5525	$998,573	$119,658	$878,915
Design	To Be Selected		3,000,000	0	3,000,000
Res.Ins.	To Be Selected		1,500,000	0	1,500,000
Isl.Con.	To Be Selected		17,000,000	0	17,000,000
Shore Con.	To Be Selected		12,000,000	0	12,000,000
Total			$34,498,573	$119,658	$34,378,915

Authority Share

$4,348,573 (12.6%). It is anticipated that the Authority will receive grant awards for the design, resident inspection and construction phases.

Current Expense Budget Impact

None.

Nut Island Digester Roof Rehabilitation

Description and Justification

The Nut Island Treatment Plant has four digesters. In 1986, the roofs of Digesters #3 and #4 were rehabilitated to increase operational efficiency, reduce odors and increase gas production. The roofs of Digesters #1 and #2 are thirty-five years old and have never been rehabilitated. The concrete roofs have cracks which allow gas to escape and damage the insulation and roofing materials.

The project consists of removal of 58,000 square feet of existing roofing materials and insulation, sealing the concrete surface so that it is gas tight, and installation of new insulation and roofs.

The roofs are expected to have a useful life of fifteen years.

Project Status and Schedule

The first design phase for Digesters #3 and #4 is active even though construction is complete. The design firm has been retained to repond to claims by the construction contractor.

Phase two, design for Digesters #1 and #2, is scheduled to begin in July, 1987 and be completed in December, 1987. Construction will begin in March, 1988 and conclude in September, 1989.

The Engineering Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Des.1	Tighe&Bond	5575	$125,000	$108,098	$16,902
Des.2	To Be Selected		50,000	0	50,000
Con.2	To Be Selected		2,000,000	0	2,000,000
Total			$2,175,000	$108,098	$2,066,902

Authority Share

$2,175,000 (100%).

Current Expense Budget Impact

None.

Deer Island Personnel Facilities

Description and Justification

The Deer Island Treatment Plant has inadequate facilities for staff, particularly for women employees. The Federal Occupational Safety and Health Administration's standards require that adequate lunchroom, locker and restroom facilities be provided. New personnel facilities are included in the Nut Island Immediate Upgrading. This project will provide Deer Island employees with similar facilities.

The project consists of design and construction of a 2,000 square foot building to include lunchroom, locker and showers, and rest rooms.

The facility is expected to have a useful life of fifteen years.

Project Status and Schedule

Design will begin in March, 1987 and last six months. Construction is scheduled to begin in November, 1987 and will be completed in April, 1989.

The Sewerage Division will be responsible for this project up until the award of a construction contract.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	To Be Selected		50,000	0	50,000
Constr.	To Be Selected		$300,000	0	$300,000
Total			$350,000	0	$350,000

Authority Share

$350,000 (100%).

Current Expense Budget Impact

Utilities and energy costs for the new building are expected to be approximately $40,000 per year. The FY89 Current Expense Budget will include estimated costs for two months.

Nut Island Sewage Pump Switchgear Replacement

Description and Justification

There are four main sewage pumps at the Nut Island Treatment Plant. The electric motor starters for these pumps are the original equipment that was installed in the late 1950s. The control panel has been in continuous service for thirty-six years. The existing wiring insulation is brittle and deteriorated from age and heat. The equipment and wiring are subject to short circuit failures and require replacement.

The project consists of rewiring and replacing the starting components of four sewage pumps. New equipment will include reduced voltage starters, 2400 volt circuit breakers, meters, relays and fuses.

The equipment is expected to have a useful life of fifteen years.

Project Status and Schedule

Design work will be performed by in-house staff. Construction is expected to begin in June, 1987 and be completed in November, 1987.

The Sewerage Division will be responsible for this project until a construction contract is awarded.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Constr.	To Be Selected		$150,000	0	$150,000

Authority Share

$150,000 (100%).

Current Expense Budget Impact

None.

Nut Island Electrical Distribution Substation Replacement

Description and Justification

The Nut Island Treatment Plant Immediate Upgrading program included replacement of two out of three electrical distribution substations. The substation that was not replaced contains the original equipment which is now thirty-six years old. The substation equipment is corroded and deteriorated from salt air and fumes from chlorine and potassium permanganate. The substation supports and housing have eroded and tipped. Complete replacement is required.

The new substation is expected to have a useful life of fifteen years.

Project Status and Schedule

Design will be done by in-house staff. Construction is scheduled to begin in June, 1987 and be completed by December, 1987.

The Sewerage Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Constr.	To Be Selected		$150,000	0	$150,000

Authority Share

$150,000 (100%).

Current Expense Budget Impact

None.

Deer Island Exhaust Silencer Replacement

Description and Justification

The Deer Island Pump Station relies on Nordberg diesel engines to generate power for pumping capacity. Each engine has an exhaust stack designed to vent smoke and reduce noise. In 1983, the original exhaust silencers were replaced by a stack that was of inferior design and construction. These stacks allow oil and other combustion by-products to accumulate in the silencer compartments and piping. As exhaust temperatures rise, the oil coating can ignite causing a stack fire. Recent fires have distorted and cracked the exhausts which will lead to eventual collapse of the silencers. Immediate replacement is required.

The project consists of removal of the existing stack silencers and replacement with three compartment, heavy construction units for engines #1, #3, #5, #7 and #9. Engines #2, #4 and #6 will be replaced by electrical turbines in the Deer Island "Fast Track" Pump and Power Station Upgrading and, therefore, do not need stack replacements.

The replacement stack silencers are expected to have a useful life of eight years.

Project Status and Schedule

Design for the stacks will be performed by in-house staff. Construction is expected to begin in March, 1987 and be completed in March, 1988.

The Sewerage Division is responsible for this project until a construction contract is awarded. The Construction Division will oversee construction.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Res.Ins.	To Be Selected		$200,000	0	$200,000
Constr.	To Be Selected		2,500,000	0	2,500,000
Total			$2,700,000	0	$2,700,000

Authority Share

$2,700,000 (100%).

Current Expense Budget Impact

None.

Nut Island Brick Chimney Repair

Description and Justification

The 100 foot high chimney at the Nut Island Treatment Plant serves two purposes. It is a flue for the boiler combustion end products and a ventilating shaft for the High Level Sewer. The chimney is almost ninety years old. The top eight feet of the chimney have deteriorated to the point where bricks are falling out to the ground below. This presents a serious safety hazard to plant personnel.

The project consists of design of the chimney elimination or replacement.

Project Status and Schedule

Design work is scheduled to begin in January, 1987 and be completed in April, 1987. A construction phase will be added if the design determines that repair of the chimney is required.

The Sewerage Division will oversee this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	To Be Selected		$10,000	0	$10,000

Authority Share

$60,000 (100%).

Current Expense Budget Impact

None.

Nut Island Sludge Cross Collector Repair

Description and Justification

The Nut Island Immediate Upgrading project has recently resulted in the replacement of all collection equipment in the sedimentation tanks at the treatment plant except for the cross sludge collectors and their steel supports. Most of the stationary steel is corroded and rusted and will no longer support the movable collectors. The loss of these collectors renders it impossible to remove the settled sludge from the sedimentation tank. Since the plant must continue operation for another nine years, repair of the cross collectors is imperative.

The project consists of repair of the raw sludge cross collectors in each of the six sedimentation tanks at Nut Island. Repairs include replacement of the bearings, bearing supports, shafts, sprockets, collector chain, flights, rails and rail supports. The surface concrete on the tank walls, ceiling and bottom will also be repaired.

The repaired sedimentation tanks are expected to have a useful life of ten years.

Project Status and Schedule

Design will be undertaken by in-house staff. Construction is expected to begin in November, 1987 and be completed in April, 1988.

The Sewerage Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Constr.	To Be Selected		$175,000	0	$175,000

Authority Share

$175,000 (100%).

Current Expense Budget Impact

None.

Deer Island Elevated Water Storage Tank

Description and Justification

The Deer Island Treatment Plant has access to a potable water supply through the Town of Winthrop water pipeline system. The Town has water pressure deficiencies which result in service delivery to the island of less than 10 pounds per square inch when only one hydrant is opened at the plant. This pressure deficiency presents a fire-fighting problem at Deer Island. Should a serious fire occur at the treatment plant, the local fire department would be forced to respond by pumping sea water. Introduction of sea water would have a detrimental effect on the fire-fighting equipment.

The Deer Island Primary and Secondary Facitilities Planning consultants are examining the long-term potable water needs of the treatment facilities. It is anticipated that the future need will be met in part by improvements to the Waterworks Division's distribution pipeline in Revere and Winthrop. However, the water supply problem needs a solution in the short-term as well.

This project consists of installation of an elevated water storage tank of sufficient size to provide an adequate standing water supply and a higher level of pressure to meet the immediate needs of the Deer Island Treatment Plant. The specific size of the tank will be determined in the design phase.

The elevated storage tank is expected to have a useful life of twenty years.

Project Status and Schedule

Design is scheduled to begin in June, 1987 and will be completed in January, 1988. Construction is expected to commence in June, 1988 and finish in May, 1989.

The Engineering Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	To Be Selected		$150,000	0	$150,000
Constr.	To Be Selected		2,000,000	0	2,000,000
Total			$2,150,000	0	$2,150,000

Authority Share

$2,150,000 (100%).

Current Expense Budget Impact

None.

Deer Island Odor Monitoring

Description and Justification

Periodically, Deer Island personnel have received complaints concerning odor emissions from the treatment plant. The Point Shirley section of Winthrop appears to be the most affected area.

This project consists of developing an odor monitoring program at Deer Island. The project will include study of optimum meter locations, specification of equipment to be used and installation of the equipment. The system will include strip chart indicators in order to maintain a permanent record of emissions.

The meters are expected to have a useful life of ten years.

Project Status and Schedule

The study phase is expected to begin in November, 1986 and be completed within a month. Design and purchase of equipment will begin in January, 1987 and finish in February, 1987. Installation of the system will begin in April, and the system is expected to be fully operational in June, 1987. An odor control panel will convene in July, 1987 and conclude in one month.

The Sewerage Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	Brown & Caldwell		$15,000	0	$15,000
Purchase	To Be Selected		100,000	0	100,000
Panel	To Be Selected		100,000	0	100,000
Total			$215,000	0	$215,000

Authority Share

$215,000 (100%).

Current Expense Budget Impact

None.

Deer Island Operation and Construction Coordination Project

Description and Justification

The Deer Island Treatment Plant is the major focus of capital improvements for FY 1987 - FY 1989. The construction projects include the Pump and Power Station Upgrade, the Chlorination Facility Rehabilitation, Sludge Thickener Rebuilding, Digester Rehabilitation, Sedimentation Tank Improvements, Electrical Upgrade, Remote Headworks Improvements, Microwave Replacement, Personnel Facilities Construction, Exhaust Silencer Replacement and Water Storage Tank Installation.

The magnitude of this construction program suggests that not only will there be logistical problems coordinating construction crews, vehicles and materials, but that plant operations will also be impacted during this period. As a result, there is a need to carefully coordinate operations and construction activities so that plant processes are not interrupted, or construction schedules impeded.

This project provides for a consultant to be responsible to oversee and coordinate day-to-day operations with all current and near-term construction.

Project Status and Schedule

The consultant is scheduled to begin work in April, 1987 and continue to at least the end of FY 1989.

The Sewerage and Construction Division Directors will oversee the consultant.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Consult.	To Be Selected		$1,000,000	0	$1,000,000

Authority Share

$1,000,000 (100%).

Current Expense Budget Impact

None.

Deer Island Digester Operation and Construction Review

Description and Justification

The Deer Island digesters have been the focus of three capital projects: improvements to the gas line, renovation of the sludge thickeners and reconstruction of the digester roofs. During the construction phase, a digester was used as a storage facility for sludge. This use resulted in damage to the digester mixing equipment and piping.

This project consists of hiring a consultant to review the damages and recommend corrective measures.

Project Status and Schedule

The consultant contract was executed in February, 1986 and is scheduled to be completed in December, 1986.

The Construction Division is responsible for overseeing the work of the consultant.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Consult.	Brown&Caldwell	5503	$140,000	$75,000	$65,000

Authority Share

$140,000 (100%).

Current Expense Budget Impact

None.

Deer Island Dual Fuel Engine/Generator Overhaul

Description and Justification

At the Deer Island Wastewater Treatment Plant there are five 1,000 horsepower Enterprise Dual Fuel Engines, four 700 kilowatt alternators and four rotary exciters which supply the power needs of the plant. This equipment has been in operation since the treatment plant opened in 1968. The equipment requires inspection and a major overhaul in order to eliminate frequent power failures.

The project consists of overhaul of the engines, alternators and exciters, and supply of spare parts.

The expected useful life of the restored equipment is twenty years.

Project Status and Schedule

The project consists of design and construction phases. Design work began in January, 1986 and was completed in October, 1986. Construction is scheduled to begin in March, 1987 and will be completed in October, 1988.

The Sewerage Division is responsible for this project up until construction contract award. The Construction Division will oversee the construction phase.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	Alonzo B. Reed	5411	$ 50,000	0	$ 50,000
Constr.	To Be Selected		2,500,000	0	2,500,000
Total			$2,550,000	0	$2,550,000

Authority Share

$2,550,000 (100%)

Current Expense Budget Impact

None.

Deer Island Cyclone Grit Removal and Sludge Grinding

Description and Justification

The rehabilitated digesters at Deer Island have been in operation for one year. Operational experience with the digesters has resulted in identification of a major problem with the mixing system. The problem consists of the build-up of rags, hair and other stringy material in the mixing system. This build-up has decreased the overall digester operating efficiency.

The consulting engineers, Brown and Caldwell, have recommended grinding and cyclonic grit separation on the raw, unthickened sludge prior to digestion. This project consists of installation of equipment to remove grit by cyclonic action.

The equipment is expected to have a useful life of twenty years.

Project Status and Schedule

The project has design and construction phases. The design phase began in September, 1986 and concluded in November, 1986. Construction is scheduled to begin in December, 1986 and finish in June, 1987.

The Construction Division is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	Brown & Caldwell	5503	$ 40,000	0	$ 40,000
Constr.	To Be Selected		258,000	0	258,000
Total			$298,000	0	$298,000

Authority Share

$298,000 (100%)

Current Expense Budget Impact

None.

WASTEWATER RESIDUALS

Composting Pilot

Description and Justification

The Authority currently discharges approximately 70 dry tons per day of digested sludge and scum into Boston Harbor. This practice is in violation of the Federal Clean Water Act. The Authority is exploring alternative methods of disposal necessary to protect water quality in the harbor.

Composting is one alternative method for land-based disposal. Composting stabilizes organic materials and destroys bacteria and viruses contained in sludge. Composted sludge has potential for use as a fertilizer. It might also be used as a soil supplement for production of turf grass and as landfill cover.

This project consists of two composting pilot projects and a marketing and distribution study. The pilot projects are intended to demonstrate the feasibility of compost production at the Deer Island Treatment Plant. The marketing study will include evaluation of the compost quality, identification of potential compost users and design of a marketing program.

The first demonstration project involves in-vessel composting. This method consists of mixing digested sludge and sawdust, placing the mixture in an enclosed tank and aerating it for a twenty-eight day period. Sufficient heat is generated to dry the sludge and to destroy pathogens.

The second demonstration project involves static pile composting. This method consists of mixing of dewatered sludge and wood chips, placing the mixture in static open-air piles and drawing air through the piles for a sixty day period.

Project Status and Schedule

The in-vessel pilot project began in February, 1986 and was completed in August, 1986.

The static pile pilot project began in November, 1984 and concluded in May, 1986. The Authority has agreed to continue operating the facility, and responsibility for this composting project has been transferred to Sewerage Division personnel.

The marketing study began in June, 1985 and is scheduled to be completed in December, 1986. A draft final report was produced in August, 1986.

The Engineering Division is responsible for the marketing study.

Project Phase and Description

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
In-Vessel	Amer.Biotech	5670	$40,000	$12,524	$27,476
Stat.Pile	Havens&Emerson	5660	370,000	270,000	100,000
Marketing	Recovery Assc.	5661	198,510	138,570	59,940
Total			$608,510	$421,094	$187,416

Authority Share

$608,510 (100%)

Current Expense Budget Impact

The costs associated with operation of the static pile compost program are included in the Sewerage Division's FY 1987 Current Expense Budget.

Interim Scum Management

Description and Justification

Scum is the floating material which is skimmed and collected from the surface of the treatment plant primary sedimentation tanks. This material is presently mixed with the sludge prior to digestion and discharge into Boston Harbor. The MWRA's goal is to terminate the discharge of scum due to its adverse effect on the harbor and its beaches.

This project consists of study, planning, design and construction of interim scum processing facilities. Interim solutions will soon be evaluated by the MWRA Board of Directors and staff. Longer-term solutions for scum disposal are being developed under the Residuals Management Facilities Plan.

The scum disposal facilities are expected to have a useful life of fifteen years and may be incorporated into the long-term residuals management plan.

Project Status and Schedule

A feasibility study began in December, 1985 and concluded in March, 1986. Facilities planning began in July, 1986 and will be completed in October, 1986. The planning phase will result in alternative solutions which will undergo an environmental review process.

Design is scheduled to begin in May, 1987 and be completed in September, 1987. Resident Inspection is expected to begin in October, 1987 and be finished in January, 1989. Construction is anticipated to begin in January, 1988 and conclude in December, 1988.

The Engineering Division is responsible for this project up until construction contract award. The Construction Division will oversee resident inspection and construction.

Project Phase and Description

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	Havens&Emerson	5675	$65,000	0	$65,000
Fac.Plan.	Havens&Emerson	5675	310,000	0	310,000
Design	To Be Selected		350,000	0	350,000
Res.Ins.	To Be Selected		200,000	0	200,000
Constr.	To Be Selected		3,500,000	0	3,500,000
Total			$4,425,000	0	$4,425,000

Authority Share

$4,425,000 (100%)

Current Expense Budget Impact

Scum facilites are expected to have and annual impact on the Sewerage Division's Current Expense Budget as follows:

Wages	$115,000
Chemicals	1,000,000
Services	2,000,000
Total	$3,115,000

The FY 1989 impact is anticipated to be $1,557,500 since the facilities are scheduled to become operational by January. The FY 1990 budget will increase by an additional $1,557,500 to cover the expense of a full year of operation.

Interim Sludge Disposal

Description and Justification

The Authority has undertaken efforts to develop an interim sludge disposal plan. Interim planning to date has focused primarily on ocean disposal. Long-term options including composting, incineration and landfilling are being explored in the Authority's Composting and Residuals Management projects.

Ocean disposal was initially examined in the Sludge Management Study of 1982. As a result of the study, ocean dumping was proposed as an interim disposal method. In October, 1985 a permit application for the Deepwater Municipal Sludge Site was prepared. A revised application was completed in May, 1986. In July, 1986 the MWRA Board of Directors voted not to file the revised application. Other disposal options are now being evaluated.

Regardless of the method of disposal, the treatment plant will require sludge storage, transfer and transport facilities. This project consists of the study, design and construction of the sludge facilities.

The facilities are expected to have a useful life of twenty years.

Project Status and Schedule

The study phase began in August, 1985 and concluded in June, 1986. The costs of preparation of the ocean dumping permit application and environmental impact report are included in the study phase. Design is expected to begin in July, 1987 and finish in November, 1987. Resident Inspection will begin in November, 1987 and end in November, 1988. Construction is scheduled to begin in November, 1987 and conclude in November, 1988.

The Engineering Division is responsible for this project until the award of a construction contract.

Project Phase and Description

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	Havens&Emerson	5660	$580,000	$120,000	$460,000
Design	To Be Selected		350,000	0	350,000
Res.Ins.	To Be Selected		300,000	0	300,000
Constr.	To Be Selected		6,000,000	0	6,000,000
Total			$7,230,000	$120,000	$7,110,000

Authority Share

$7,230,000 (100%)

Current Expense Budget Impact

The annual impact on the Sewerage Division's Current Expense Budget is expected to be as follows:

Wages	$135,000
Pro.Services	1,000,000
Services	10,000,000
Total	$11,135,000

The FY 1989 impact is expected to be $6.5 million since the facilities will become operational in December. The FY 1990 Budget will increase by an additional $4.635 for a full year of operation.

Residuals Management

Description and Justification

Residuals Management is the coordination of all study, design and construction activities related to mid-term and long-term processing and disposal of residuals generated by the sewage treatment process. Residuals include sludge, scum and grit and screenings.

This project consists of facilities planning, design and construction of residuals management facilities. The planning effort includes assessment of the quantity and quality of Deer Island and Nut Island sludge, survey of available sludge processing technologies, selection of appropriate technologies, screening of potential disposal sites and selection of optimum facilities and sites. Design and construction will include both on-island and mainland facilites.

The residuals management facilities are expected to have a useful life of twenty years.

Project Status and Schedule

The first study phase of residuals management began in July, 1985 and was completed in May, 1986. Phase one included preliminary determination of existing sludge quantity and quality, surveying of current processing technologies, initial screening of disposal sites, and development of a methodology for completion of facilities planning.

Phase two began in August, 1986 and is scheduled to be completed in May, 1988. Phase two has two components: mid-term and long-term planning.

Mid-term planning includes further evaluation of existing disposal technologies and sites, selection of a managable number of sites for detailed study, and recommendation of a mid-term disposal plan. Mid-term planning is scheduled to be completed in April, 1987.

Long-term planning includes in-depth environmental testing of selected sites and recommendation of a plan for long-term management of residuals for the new Deer Island Primary and Secondary Treatment Plant. Long-term planning is scheduled to be completed in May, 1988.

Land acquisition processes are anticipated to begin in August, 1986 and be completed in June, 1989.

Mid-term design is expected to begin in November, 1987 and be finished in November, 1988. Resident inspection will begin in February, 1989 and conclude in November, 1991. Mid-term construction is anticipated to begin in April, 1989 and be completed in September, 1991.

The Engineering Division is responsible for this project.

Project Phase and Description

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Phase 1	SEA Assc.	5662	$534,537	$415,458	$119,079
Phase 2	Black & Veatch	5664	8,500,000	0	8,500,000
Land			10,000,000	0	10,000,000
C.A.C.			60,000	0	60,000
Design	To Be Selected		8,000,000	0	8,000,000
Res.Ins.	To Be Selected		3,000,000	0	3,000,000
Constr.	To Be Selected		80,000,000	0	80,000,000
Total			$110,094,537	$415,458	$109,679,079

Authority Share

$103,819,537 (94.3%). The Authority has received a grant for Phase 1. It is anticipated that a grant will be awarded for Phase 2. Mid-term design and construction are not anticipated to be grant eligible.

Current Expense Budget Impact

The impact on the Current Expense Budget will be estimated during the design phase.

Deer Island Landfill Closure

Description and Justification

The Deer Island landfill is a disposal site for the grit and screenings of the treatment plant and North System headworks and CSO facilities. The landfill has been used since the mid-1960s. In May, 1985, the Department of Environmental Quality Engineering directed that the landfilling activities on Deer Island cease and that the Authority develop a remedial action plan. In November, 1986, the Authority will begin hauling of grit and screenings to a landfill outside Massachusetts.

This project consists of interim closure of the Deer Island landfill. The decision on permanent closure will await secondary facilities planning to determine if the landfill will remain or be excavated to make way for new facilites.

Interim closure includes grading and installation of drainage trenches, catchbasins and drain pipe to improve site drainages, capping the landfill with 18 inches of soil, and covering the soil with 6 inches of loam, compost and seeding.

The interim landfill closure is expected to have a useful life of five years.

Project Status and Schedule

The project start date is contingent upon the grit and screenings contract start at Deer Island. The landfill closure is scheduled to begin in March, 1987 and conclude in September, 1987.

The Engineering Division is responsible for this project.

Project Phase and Description

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Constr.	To Be Selected		$100,000	0	$100,000

Authority Share

$100,000 (100%)

Current Expense Budget Impact

The expense of hauling grit and screenings is budgeted in the FY 1987 Sewerage Division's Current Expense Budget.

COMBINED SEWER OVERFLOWS

Boston Gatehouses

Description and Justification

The Boston Gatehouses are located in the Fenway section of the City of Boston. The gatehouses are part of the Boston Water and Sewer Commission sewer system. In dry weather conditions, the gatehouse sluice gates prevent flows from the the Stony Brook and Old Stony Brook conduits from discharging into the Fens Pond. Flows are then conveyed to the MWRA Fens Gatehouse. During wet weather, the Stony Brook and Old Stony Brook flows carry suspended grit and sanitary deposits over the gatehouse sluice gates and into the pond.

This project consists of a study to determine the alternatives to minimize impacts to the Gatehouses. An earlier study had recommended demolition of Gatehouse #1. However, since the existing gatehouses are on the National Register of Historic Places, any modifications of the gatehouses must have minimal impact on the Olmstead Park System. Consequently, the current study is examining alternatives to solve the overflow problem while maintaining the surface structures.

Project Status and Schedule

The study began in October, 1984 and is scheduled for completion in December, 1986.

The Engineering Division is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	Metcalf&Eddy	5750	$100,000	$20,777	$79,223

Authority Share

$25,000 (25%). The Authority has received a grant for the study phase.

Current Expense Budget Impact

None.

Commercial Point CSO Facility

Description and Justification

Commercial Point is located in the Tenean Beach section of Dorchester in the City of Boston. The Boston Water and Sewer Commission has an overflow outlet at Commercial Point where raw sewerage discharges occur during wet weather flows.

This project consists of construction of a 194 mgd screening and disinfection facility at Commercial Point. The facility will include a 70 x 50 foot building equipped with diversion structures, tide gates, underground conduits, mechanical screen, storage and feed equipment for chlorination, an engine generator, heating and ventilation systems and a scrubber system for odor control. Commercial Point will be an unstaffed facility. Consequently, remote alarms will also be installed at the Prison Point CSO Facility in East Cambridge. The facility will be built on National Guard Armory property on Victory Road.

The new facility is expected to have a useful life of twenty years.

Project Status and Schedule

The design contract includes both Commercial Point and Fox Point. Design for Commercial Point began in January, 1984 and should be completed in February, 1987. The land acquisition process will begin in January, 1987 and should conclude within three months. Resident Inspection is expected to begin in February, 1987 and finish in December, 1988. Construction is scheduled to begin in May, 1987 and conclude in September, 1988.

The Engineering Division is responsible for this project up until construction contract award. The Construction Division will oversee resident inspection and construction.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	Hayden,Wegman	5755	$345,463	$235,993	$109,470
Land			2,000	0	2,000
Res.Ins.	To Be Selected		600,000	0	600,000
Constr.	To Be Selected		6,000,000	0	6,000,000
Total			$6,947,463	$235,993	$6,711,470

Authority Share

$878,463 (12.6%). The Authority has received grant awards for the design, resident inspection and construction phases. Land costs are not grant eligible.

Current Expense Budget Impact

None.

CSO Technical Assistance

Description and Justification

The Federal Court has asked the MWRA to identify additional CSO projects beyond those currently in the Authority's capital program. In order to provide a timely response, the Authority must immediately begin a CSO planning process which may lead to future design and construction projects.

This project consists of technical planning assistance beginning with an engineering services contract. The services will include all technical support for the Combined Sewer Overflow program. Tasks identified to date include review of previous CSO planning efforts, assessment of relevant water quality standards, survey of other Metropolitan area CSO programs and inventory of available CSO sites. Future tasks may include study of alternatives for dry weather overflow abatement; determination of best management practices for the MWRA and member community sewer systems; re-evaluation of the Charles River CSO Facilities Plan, and assistance in analyzing the issues of agency responsibility for CSO program management, implementation and financing.

The project also includes preliminary minimum future design and construction phases for an expanded CSO program in FY 1988 and FY 1989.

Project Status and Schedule

The planning phase began in March, 1986 and ends in December, 1988. Design is expected to begin in December, 1987 and conclude in August, 1988. Construction is scheduled to begin in October, 1988 and finish in February, 1990.

The Engineering Division is responsible for this project up until construction contract award. The Construction Division will oversee the construction phase.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Plan.	CH2M-Hill	5790	$450,000	0	$450,000
Design	To Be Selected		400,000	0	400,000
Constr.	To Be Selected		1,600,000	0	1,600,000
Total			$2,450,000	0	$2,450,000

Authority Share

$1,250,000 (51%). It is anticipated that the Authority will receive grant awards for the planning, design and construction phases.

Current Expense Budget Impact

None.

St. Mary's Street CSO Modifications

Description and Justification

The St. Mary's Street CSO is a Boston Water and Sewer Commission (BWSC) overflow outlet located near the Boston University Bridge on the Brookline/Boston line. The overflow outlet is activated when BWSC flows cannot be accommodated by the MWRA Charles River Valley Sewer. This situation occurs when the Charles River Valley Sewer is already transporting maximum flows.

Previous design work proposed detention and screening facilities at St. Mary's Street. However, a more efficient alternative now appears feasible. The current plan includes in-line storage for wet weather flows and transport to the Cottage Farm CSO Facility via an existing, but currently unused, 54 inch subaqueous pipe under the river. This alternative eliminates the need for a new CSO facility and increases the efficient use of the Cottage Farm detention and screening facilities. Modifications will also be made to the Charles River Valley Sewer connections to both the South Charles Relief Sewer and the Brookline main sewer to enhance flow capacity.

The project consists of system connection modifications, removal of an existing bulkhead to activate the subaqueous pipe, construction of two detention tanks and new overflow structures with automatic flow control gates.

The new facilities are expected to have a useful life of twenty years.

Project Status and Schedule

The original design work began in April, 1984 and was completed in April, 1985. The design revision is scheduled to begin in October, 1986 and be completed by July, 1987. Resident inspection will begin in December, 1987 and finish in August, 1989. Construction will begin in January, 1988 and conclude in July, 1989.

The Engineering Division is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	Mistry Assc.	5765	$85,000	$12,965	$72,035
Res.Ins.	To Be Selected		201,000	0	201,000
Constr.	To Be Selected		2,010,000	0	2,010,000
Total			$2,296,000	$12,965	$2,283,035

Authority Share

$748,000 (32.6%). It is anticipated that the Authority will receive a grant award for the resident inspection and construction phases.

Current Expense Budget Impact

None.

Somerville Marginal CSO Rehabilitation

Description and Justification

The Somerville Marginal CSO Facility was constructed in 1973 as an experimental demonstration facility. Most of the original equipment proved unreliable even in the early years of operation. Much of the equipment is now inoperable. As a result, the facility is discharging inadequately treated sewage into the Lower Mystic River Basin. Rehabilitation of the facility is required to improve the screening and disinfection systems.

The project consists of replacement of the disinfection, HVAC, flow metering, sluice gates and gas detection systems, and construction of a building addition for screenings. Since Somerville Marginal is an unstaffed facility, a remote control panel at Prison Point will also be installed.

The facility and equipment is expected to have a useful life of twenty years.

Project Status and Schedule

Design began in February, 1985 and was completed in September, 1986. The design contract includes provision for construction services. Construction is expected to begin in April, 1987 and be finished in June, 1988.

The Sewerage Division is responsible for this project up until award of a construction contract.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	Tighe&Bond	5770	$176,300	$130,630	$45,670
Constr.	To Be Selected		1,200,000	0	1,200,000
Total			$1,376,300	$130,630	$1,245,670

Authority Share

$1,376,300 (100%)

Current Expense Budget Impact

None.

Fox Point CSO Facility

Description and Justification

The Boston Water and Sewer Commission (BWSC) has two overflow outlets at Malibu and Savin Hill beaches in Dorchester in the City of Boston. This project consists of construction of a 116 mgd screening and disinfection CSO facility in the Savin Hill section of Dorchester to treat sewage now being discharged through the BWSC outlets.

The project involves construction of a 50 x 50 foot single-story building to house the diversion structures, tide gates, underground conduits, mechanical screen, storage and feed equipment for chlorination, an engine generator, heating and ventilation systems and a scrubber for odor control. Remote alarms will be installed at Prison Point since the Fox Point CSO Facility will be unstaffed.

The facility is expected to have a useful life of twenty years.

Project Status and Schedule

Design began in January, 1984 and was substantially complete in July, 1986. Design work for Fox Point and Commercial Point CSO facilities was combined into one contract. The design budget appears in the Commercial Point project description.

Land acquisition is scheduled for January, 1987. Resident inspection is expected to begin in February, 1987 and conclude in August, 1988. Construction is anticipated to begin in March, 1987 and conclude in July, 1988.

The Engineering Division is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Land			$2,000	0	$2,000
Res.Ins.	To Be Selected		400,000	0	400,000
Constr.	To Be Selected		4,000,000	0	4,000,000
Total			$4,402,000	0	$4,402,000

Authority Share

$442,000 (10%). The Authority has received a grant for the resident inspection and construction phases.

Current Expense Budget Impact

None.

Moon Island CSO Facility

Description and Justification

The Boston Water and Sewer Commission maintains overflow outlets in South Boston and Dorchester which are activated when flows cannot be accommodated by the MWRA Columbus Park Headworks. Relief is provided through either the overflow outlets or the BWSC Calf Pasture/Moon Island complex. Discharges from the outlets are untreated. Discharges from Calf Pasture are chlorinated during dry weather, but not in wet weather. After construction of Fox Point and Commercial Point, the only remaining untreated discharges in Dorchester Bay will be from the BWSC outlets and Calf Pasture.

All options under consideration for treatment involve consolidation of the overflows, transport of the flow to Calf Pasture and treatment at either Calf Pasture or Moon Island. The consolidation conduit would be 10,000 linear feet of 36 to 72 inch pipe. The pipeline route would travel from Columbus Park to Calf Pasture. The treatment facility would provide screening, storage, sedimentation and disinfection. After public and agency reviews, additional alternatives may be investigated.

The expected useful life of the facility would be thirty years. Equipment would have a useful life of fifteen years.

Project Status and Schedule

The study phase began in September, 1985 and was completed in September, 1986. Facilities planning is contingent upon the long-range study recommendation and is tentatively scheduled to begin in April, 1987 and be completed in January, 1989. Design is anticipated to begin in September, 1988 and be finished in October, 1990. The Engineering Division is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	Camp, Dresser	5785	$279,972	$172,000	$107,972
Fac.Plan.	To Be Selected		600,000	0	600,000
Design	To Be Selected		2,000,000	0	$2,000,000
Total			$2,879,972	$172,000	$2,707,972

Authority Share

$288,972 (10%). The Authority has received a study grant. It is expected that facility planning and design grants will be forthcoming.

Current Expense Budget Impact

None.

Cottage Farm and Charlestown Pump Repair

Description and Justification

The Cottage Farm CSO Facility is located on the Charles River in Cambridge. Repairs to the screening system, one pumping unit and a diesel engine are required to restore full capacity to the station. The Charlestown Pump Station also requires pump repairs to return an out-of-service pump to working condition.

This project consists of upgrading the support system for the screens and replacement of the #2 diesel engine at Cottage Farm and repair of electric Pump #1 at Cottage Farm and electic Pump #2 at the Charlestown Pump Station. These three projects are combined because of the similar nature of the work proposed and the proximity of the stations. The Cottage Farm work includes installation of semi-automatic screens, time clocks and water level sensing equipment and repair of the 45 mgd electric pump. The Charlestown work involves repair of the 45 mgd electric pump.

The repaired equipment is expected to have a useful life of ten years.

Project Status and Schedule

Repairs to the screens and electric pumps are scheduled for Feburary, 1987 and will be completed in July, 1987. Repairs to the diesel engine are expected to begin in October, 1987 and conclude in June, 1988.

The Sewerage Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Constr.1	To Be Selected		$467,000	0	$467,000
Constr.2	To Be Selected		200,000	0	200,000
Total			$667,000	0	$667,000

Authority Share

$667,000 (100%).

Current Expense Budget Impact

None.

Constitution Beach CSO Facility

Description and Justification

The Constitution Beach CSO Facility is located in East Boston next to Logan Airport. This project consists of design and construction of a treatment facility for the overflow discharges at Constitution Beach. The facility will include screening and disinfection equipment.

The facility is expected to have a useful life of twenty years.

Project Status and Schedule

Design began in July, 1984 and was completed in August, 1986. Construction began in September, 1985 and was completed in August, 1986.

The Engineering and Construction Divisions are responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	Hayden,Wegman	5380	$73,212	$64,553	$8,659
Constr.	WES Corp.	5781	1,096,212	662,000	434,212
Total			$1,169,424	$726,553	$442,871

Authority Share

$151,424 (13%). The Authority has received grant awards for the design and construction phases.

Current Expense Budget Impact

None.

OTHER WASTEWATER CAPITAL PROJECTS

OSHA Report Action Project

Description and Justification

An occupational safety and health study of the Sewerage Division's facilities was completed in 1985. The study report cited safety issues that need correction. The issues include the presence of asbestos insulation, inadequate heating and ventilation, the absence of alarm and communication systems, the lack of water and gas tight doors, the dearth of rodent and pest control and the prevalence of electrical hazards.

This project provides funding for a series of individual contracts to address and correct the safety deficiencies as identified in the report. The contracts will include removal of asbestos and replacement with other insulating material, upgrading of heating and ventilating systems, installation of communications systems, door repair or replacement and rehabilitation of electrical systems.

The new equipment is expected to have a useful life of fifteen years.

Project Status and Schedule

Design will be done by in-house staff. The construction contracts are expected to be executed beginning in November, 1987.

The Construction Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Constr.	To Be Selected		$3,750,000	0	$3,750,000

Authority Share

$3,750,000 (100%)

Current Expense Budget Impact

Rodent and pest control programs will be proposed in the Sewerage Division's FY 1988 Current Expense Budget proposal.

Industrial Discharge Limitations

Description and Justification

This project consists of development of industrial discharge limitations as required by the Environmental Protection Agency. The limitations will pertain to the discharge of toxic or other contaminents into the MWRA sewer system by industries.

There are three policy goals for implementation of industrial discharge limitations. The first is to reduce contaminent concentration such that discharge to Boston Harbor is prevented or reduced to acceptable levels. The second goal is to ensure efficient treatment plant operations. The third goal is to eliminate contamination of sludge in order to maintain all disposal options.

Project Status and Schedule

Development of industrial discharge limitations began in July, 1986 and was completed in August, 1986.

The Sewerage Division is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	Black&Veatch	5852	$195,700	0	$195,700

Authority Share

$195,700 (100%).

Current Expense Budget Impact

None.

WASTEWATER CAPITAL PROJECTS CASH FLOW

FISCAL YEARS 1987 - 1989

FISCAL YEAR 1987-1989
WASTEWATER CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000'S)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FY87-FY89	BEYOND FISCAL YEAR 1989
WASTEWATER INTERCEPTION & PUMPING	193,182	13,412	2,762	4,645	4,077	4,010	8,192	7,397	8,381	8,997	13,344	12,107	12,995	12,111	99,018	80,752
WASTEWATER TREAT.	249,804	18,394	4,618	5,402	4,659	10,875	15,070	12,227	10,016	7,490	7,098	15,380	17,556	21,288	131,679	99,567
WASTEWATER RESIDUALS	122,459	958	512	944	1,455	6,530	6,940	2,085	1,938	4,488	4,138	4,139	3,689	1,643	38,501	83,000
SEWER OVERFLOWS	22,287	1,300	418	441	208	1,235	2,504	4,115	4,110	1,420	1,055	935	1,011	845	18,297	2,690
WASTEWATER - OTHER	3,946	0	0	196	0	0	0	0	1,500	750	750	750	0	0	3,946	0
FINAL PAYMENTS			0	0	249	0	0	0	0	0	0	0	0	0	249	0
GRAND TOTAL WASTEWATER:	$591,678	$34,064	$8,310	$11,628	$10,648	$22,650	$32,706	$25,824	$25,945	$23,145	$26,385	$33,311	$35,251	$35,887	$291,690	$266,009

FISCAL YEAR 1987-1989
WASTEWATER CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000'S)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FY87-FY89	BEYOND FISCAL YEAR 1989
I. WASTEWATER INTERCEPTION AND PUMPING:																
Braintree-Weymouth Relief Facilities																
EIR	676	205	105	80	80	106	100	0	0	0	0	0	0	0	471	0
Facilities Plan	347	327	0	0	20	0	0	0	0	0	0	0	0	0	20	0
Design II	850	0	0	0	0	0	0	170	170	170	170	170	0	0	850	0
Land Acquisition	100	0	0	0	0	0	25	25	25	25	0	0	0	0	100	0
Constr. Services	1,500	0	0	0	0	0	0	0	0	500	500	500	0	0	1,500	0
Construction I	9,100	0	0	0	0	0	0	0	0	0	1,114	1,114	1,114	1,114	4,456	4,644
Construction II	18,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18,000
Sub-total	30,573	532	105	80	100	106	125	195	195	695	1,784	1,784	1,114	1,114	7,397	22,644
Charlestown Pump. Station																
Design	656	574	82	0	0	0	0	0	0	0	0	0	0	0	82	0
Construction	11,800	0	0	0	0	0	600	1,200	2,500	2,500	2,000	1,500	900	500	11,700	100
Resident Inspection	1,000	0	0	0	0	25	75	200	200	200	200	50	25	25	1,000	0
Land Acquisition	500	0	0	500	0	0	0	0	0	0	0	0	0	0	500	0
Sub-total	13,956	574	82	500	0	25	675	1,400	2,700	2,700	2,200	1,550	925	525	13,282	100
East Boston Pumping Station/Winthrop																
Land Acquisition	25	0	0	0	25	0	0	0	0	0	0	0	0	0	25	0
Design	2,236	1,214	101	146	146	146	146	123	214	0	0	0	0	0	1,022	0
Resident Inspection	2,365	0	165	165	238	238	238	238	247	247	176	176	237	0	2,365	0
Constr.-Caruso St.	18,098	0	500	2,220	2,140	1,642	1,642	1,642	1,642	1,620	1,620	1,620	1,810	0	18,098	0
Constr.-Winthrop	4,850	0	0	0	0	300	1,151	731	731	731	720	486	0	0	4,850	0
Constr.-Chelsea	5,070	0	0	0	0	0	300	1,082	792	792	792	790	522	0	5,070	0
Constr.-Stean St.	200	0	0	0	0	0	0	0	0	0	0	0	0	45	45	155
Constr.-North Met.	200	0	0	0	0	0	0	0	0	45	45	45	45	20	200	0
Sub-total	33,044	1,214	766	2,531	2,549	2,326	3,477	3,816	3,626	3,435	3,353	3,117	2,614	65	31,675	155
Fraising. Ext. Relief Sewer																
Design	1,098	477	126	100	100	100	195	0	0	0	0	0	0	0	621	0
Construction	20,000	0	0	0	0	0	0	0	0	0	0	0	3,000	5,000	8,000	12,000
Resident Inspection	2,000	0	0	0	0	0	0	0	0	0	0	100	200	300	600	1,400
Land Acquisition	1,000	0	0	0	500	500	0	0	0	0	0	0	0	0	1,000	0
Sub-total	24,098	477	126	100	600	600	195	0	0	0	0	100	3,200	5,300	10,221	13,400

FISCAL YEAR 1987-1989
WASTEWATER CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000'S)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FY87-FY89	BEYOND FISCAL YEAR 1989
Hinghas Pumping Station																
Design	424	332	40	52	0	0	0	0	0	0	0	0	0	0	92	0
Construction	1,500	0	0	0	0	0	200	200	300	400	200	200	0	0	1,500	0
Resident Inspection	325	0	0	0	0	40	40	40	40	40	40	45	40	0	325	0
Sub-total	2,249	332	40	52	0	40	240	240	340	440	240	245	40	0	1,917	0
Millbrook Valley Inter.																
Design 1	596	476	60	60	0	0	0	0	0	0	0	0	0	0	120	0
Design 2	375	306	34	35	0	0	0	0	0	0	0	0	0	0	69	0
Construction 1	4,548	4,233	150	165	0	0	0	0	0	0	0	0	0	0	315	0
Construction 2	685	647	19	19	0	0	0	0	0	0	0	0	0	0	38	0
Sub-total	6,204	5,662	263	279	0	0	0	0	0	0	0	0	0	0	542	0
Reading Pumping Station Ex. Relief																
Design	462	348	40	35	24	15	0	0	0	0	0	0	0	0	114	0
Pump. Sta./Constr.	2,215	1221	500	294	200	0	0	0	0	0	0	0	0	0	994	0
Relief Sew./Constr.	2,035	1570	300	80	40	45	0	0	0	0	0	0	0	0	465	0
Resident Inspection	313	209	35	29	20	20	0	0	0	0	0	0	0	0	104	0
Sub-total	5,025	3,348	875	438	284	80	0	0	0	0	0	0	0	0	1,677	0
Slade's Siphon																
Design	88	57	0	20	11	0	0	0	0	0	0	0	0	0	31	0
Resident Inspection	50	0	0	0	0	0	10	10	10	10	10	0	0	0	50	0
Construction	500	0	0	0	0	0	100	100	100	150	50	0	0	0	500	0
Sub-total	638	57	0	20	11	0	110	110	110	160	60	0	0	0	581	0
Welles. Ext. Replace. Sewer																
EIR/Design	1,184	621	140	140	140	143	0	0	0	0	0	0	0	0	563	0
Construction	31,000	0	0	0	0	0	0	0	0	0	3,875	3,875	3,875	3,875	15,500	15,500
Constr. Services	1,500	0	0	0	0	0	0	0	50	50	187	188	187	188	850	650
Land Acquisition	2,000	0	0	0	0	0	2,000	0	0	0	0	0	0	0	2,000	0
Sub-total	35,684	621	140	140	140	143	2,000	0	50	50	4,062	4,063	4,062	4,063	18,913	16,150

FISCAL YEAR 1987-1989
WASTEWATER CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000'S)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FY87-FY89	BEYOND FISCAL YEAR 1989
South Maintenance Facility																
Design	50	0	25	25	0	0	0	0	0	0	0	0	0	0	50	0
Construction	2,400	0	0	0	0	0	480	480	480	480	480	0	0	0	2,400	0
Resident Inspection	100	0	0	0	0	0	20	20	20	20	20	0	0	0	100	0
Sub-total	2,550	0	25	25	0	0	500	500	500	500	500	0	0	0	2,550	0
New Neponset Valley Relief																
Facility Plan	568	474	0	30	64	0	0	0	0	0	0	0	0	0	94	0
EIR	700	0	0	0	0	175	175	175	175	0	0	0	0	0	700	0
Design	800	0	0	0	0	0	0	0	0	200	200	200	200	0	800	0
Land Acquisition	500	0	0	0	0	0	0	0	0	250	250	0	0	0	500	0
Constr. Services	1,000	0	0	0	0	0	0	0	0	0	0	0	0	110	110	890
Construction	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25,000
Sub-total	28,568	474	0	30	64	175	175	175	175	450	450	200	200	110	2,204	25,890
Quincy Pump Facility																
Study	750	0	0	0	0	75	100	100	100	100	100	175	0	0	750	0
Design	1,500									100	100	100	100	200	600	900
Sub-total	02,250	0	0	0	0	75	100	100	100	200	200	275	100	200	1,350	900
N.Charles Met. Relief Sewer																
Study	500	0	0	0	0	0	0	0	0	0	100	100	100	100	400	100
Wake. Branch & Trunk Sewers																
Study	500	0	0	0	0	0	0	0	0	0	100	100	100	100	400	100
Watertown Siphon																
Construction	380	0	0	0	0	0	95	95	95	95	0	0	0	0	380	0
Southern System Modeling	2,284	83	340	450	279	340	209	430	153	0	0	0	0	0	2,201	0
Belle Isle Siphon																
Design	49	38	0	0	0	0	1	1	2	2	5	0	0	0	11	0
Construction	950	0	0	0	0	0	150	200	200	150	150	100	0	0	950	0
Resident Inspectio	80	0	0	0	0	0	15	15	15	15	15	5			80	0
Sub-total	1,079	38	0	0	0	0	166	216	217	167	170	105	0	0	1,041	0

FISCAL YEAR 1987-1989
WASTEWATER CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000'S)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FY87-FY89	BEYOND FISCAL YEAR 1989
Deer Island Sewer System and Rehabilitation																
Design	350	0	0	0	50	50	50	45	45	30	25	18	15	9	337	13
Construction	450	0	0	0	0	0	0	0	0	0	0	0	125	125	250	200
Sub-total	800	0	0	0	50	50	50	45	45	30	25	18	140	134	587	213
Sewer System Metering																
Study I	300	0	0	0	0	50	75	75	75	25	0	0	0	0	300	0
Design	200	0	0	0	0	0	0	0	0	50	100	50	0	0	200	0
Construction	2,000	0	0	0	0	0	0	0	0	0	0	400	400	400	1,200	800
Study II	300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	300
Sub-total	2,800	0	0	0	0	50	75	75	75	75	100	450	400	400	1,700	1,100
TOTAL: WASTEWATER INTERCEPTION & PUMPING	$193,182	$13,412	$2,762	$4,645	$4,077	$4,010	$8,192	$7,397	$8,381	$8,997	$13,344	$12,107	$12,995	$12,111	$99,018	$80,752
II. WASTEWATER TREATMENT																
D.I. Pump and Power Station Upgrade																
Design	2,027	1,748	279	0	0	0	0	0	0	0	0	0	0	0	279	0
Construction	25,399	0	1,800	2,500	2,300	3,800	6,600	3,500	1,200	660	350	440	825	730	24,705	694
Constr. Services	2,620	0	180	180	180	180	180	180	180	180	180	180	180	180	2,160	460
Sub-total	30,046	1,748	2,259	2,680	2,480	3,980	6,780	3,680	1,380	840	530	620	1,005	910	27,144	1,154
Deer Island Chlorin. Fac.																
Design	168	151	17	0	0	0	0	0	0	0	0	0	0	0	17	0
Construction	2,200	0	0	0	200	400	800	400	200	100	100	0	0	0	2,200	0
Resident Inspection	190	0	0	0	20	40	60	30	20	10	10	0	0	0	190	0
															0	0
Sub-total	2,558	151	17	0	220	440	860	430	220	110	110	0	0	0	2,407	0
D.I. Sludge Thicken Rebuilding																
Construction	1,487	574	472	441	0	0	0	0	0	0	0	0	0	0	913	0
Design 2	20	0	0	0	0	20	0	0	0	0	0	0	0	0	20	0
Construction 2	75	0	0	0	0	0	30	45	0	0	0	0	0	0	75	0
Sub-total	1,582	574	472	441	0	20	30	45	0	0	0	0	0	0	1,008	0

FISCAL YEAR 1987-1989
WASTEWATER CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000'S)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FY87-FY89	BEYOND FISCAL YEAR 1989
Deer Island Digesters																
Design	404	389	15	0	0	0	0	0	0	0	0	0	0	0	15	0
Construction 1	3,912	3,416	200	296	0	0	0	0	0	0	0	0	0	0	496	0
Construction 2	3,453	2,912	200	341	0	0	0	0	0	0	0	0	0	0	541	0
Sub-total	7,769	6,717	415	637	0	0	0	0	0	0	0	0	0	0	1,052	0
D. I. Electrical Upgrade																
Design	196	168	28	0	0	0	0	0	0	0	0	0	0	0	28	0
Construction	1,749	0	0	262	262	262	262	262	439	0	0	0	0	0	1,749	0
Resident Inspection	242	0	0	15	45	45	45	45	47	0	0	0	0	0	242	0
Sub-total	2,187	168	28	277	307	307	307	307	486	0	0	0	0	0	2,019	0
D. I. Sed. Tank System																
Design	380	164	6	20	0	0	15	15	20	25	25	25	25	25	201	15
Construction	11,330	0	0	0	0	0	500	1,300	2,000	1,300	1,200	1,200	1,200	1,200	9,900	1,430
Resident Inspection	680	0	0	0	0	0	50	100	100	100	70	70	70	60	620	60
Sub-total	12,390	164	6	20	0	0	565	1,415	2,120	1,425	1,295	1,295	1,295	1,285	10,721	1,505
D. I. Remote Headworks																
Design	823	519	76	76	76	76	0	0	0	0	0	0	0	0	304	0
Construction	19,400	0	0	0	0	2,450	2,450	2,400	2,400	2,400	2,400	2,450	2,450	0	19,400	0
Resident Inspection	1,272	0	0	0	0	190	190	180	180	170	170	164	28	0	1,272	0
Sub-total	21,495	519	76	76	76	2,716	2,640	2,580	2,580	2,570	2,570	2,450	2,478	0	20,812	0
Nut Island Upgrade																
Facilities Planing	1,454	1,303	0	151	0	0	0	0	0	0	0	0	0	0	151	0
Design 1	1,193	893	60	60	40	40	30	30	20	20	0	0	0	0	300	0
Design 2	60	0	0	0	0	30	30	0	0	0	0	0	0	0	60	0
Construction 2	913	805	75	33	0	0	0	0	0	0	0	0	0	0	108	0
Construction 3	299	244	30	25	0	0	0	0	0	0	0	0	0	0	55	0
Construction 4	897	701	100	96	0	0	0	0	0	0	0	0	0	0	196	0
Construction 5	3,063	3,014	40	9	0	0	0	0	0	0	0	0	0	0	49	0
Construction 6	500	0	0	0	0	0	0	160	160	160	20	0	0	0	500	0
Construction 7	2,500	0	0	0	0	0	550	500	400	400	300	350	0	0	2,500	0
Construction 8	1,084	1,074	10	0	0	0	0	0	0	0	0	0	0	0	10	0
Sub-total	11,963	8,034	315	374	40	70	610	690	580	580	320	350	0	0	3,929	0

FISCAL YEAR 1987-1989
WASTEWATER CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000'S)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FY87-FY89	BEYOND FISCAL YEAR 1989
Deer Island Microwave	235	16	150	69	0	0	0	0	0	0	0	0	0	0	219	0
Deer Island Facility Plan																
Planning	4,757	0	500	500	500	500	500	500	500	500	200	557	0	0	4,757	0
Planning, EIR	3,700	0	0	0	600	600	600	600	600	200	200	115	185	0	3,700	0
Site Development	1,100	0	0	0	0	0	0	0	0	0	183	183	183	183	732	368
Design/Pri.Tx.Plant	37,000	0	0	0	0	0	0	0	0	0	0	0	6,000	6,000	12,000	25,000
Design/Sec.Tx.Plant	52,000	0	0	0	0	0	0	0	0	0	0	0	0	5,000	5,000	47,000
Design/Outflow P.	4,800	0	0	0	0	0	0	0	0	0	0	0	0	700	700	4,100
Design/Har. Tunnel	8,000	0	0	0	0	0	0	0	0	0	0	0	0	1,150	1,150	6,850
Design/N.I.Closeout	1,600	0	0	0	0	0	0	0	0	0	0	0	0	200	200	1,400
Sub-total	112,957	0	500	500	1,100	1,100	1,100	1,100	1,100	700	583	855	6,368	13,233	28,239	84,718
Water Trans. Fac. (Pier)																
Study	999	120	350	200	100	229	0	0	0	0	0	0	0	0	879	0
Design	3,000	0	0	0	0	600	800	800	400	400	0	0	0	0	3,000	0
Resident Inspection	1,500	0	0	0	0	0	0	0	0	150	150	150	150	150	750	750
Const., On-Island	17,000	0	0	0	0	0	0	0	0	0	0	6,000	3,000	3,000	12,000	5,000
Const.,Site Acqui.	12,000	0	0	0	0	0	0	0	0	0	0	2,000	2,000	2,000	6,000	6,000
Sub-total	34,499	120	350	200	100	829	800	800	400	550	150	8,150	5,150	5,150	22,629	11,750
Nut Island Digestor Roof 1 & 2																
Design 1	125	108	17	0	0	0	0	0	0	0	0	0	0	0	17	0
Design 2	50	0	0	0	0	0	25	25	0	0	0	0	0	0	50	0
Construction	2,000	0	0	0	0	0	0	0	0	210	750	200	200	200	1,560	440
Sub-total	2,175	108	17	0	0	0	25	25	0	210	750	200	200	200	1,627	440
D. I. Person. Fac.Upgrade																
Design	50	0	0	0	0	25	25	0	0	0	0	0	0	0	50	0
Construction	300	0	0	0	0	0	0	0	50	30	40	60	60	60	300	0
Sub-total	350	0	0	0	0	25	25	0	50	30	40	60	60	60	350	0
N. I. Sewage Pump Switch	150	0	0	0	0	0	75	75	0	0	0	0	0	0	150	0
Nut Island Electric Distri. Substa. Replace.	150	0	0	0	0	0	80	70	0	0	0	0	0	0	150	0

FISCAL YEAR 1987-1989
WASTEWATER CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000'S)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FY87-FY89	BEYOND FISCAL YEAR 1989
D. I. Exhaust and Silencer																
Construction	2,500	0	0	0	0	1,000	500	500	500	0	0	0	0	0	2,500	0
Resident Inspection	200	0	0	0	0	50	50	50	50	0	0	0	0	0	200	0
Sub-total	2,700	0	0	0	0	1,050	550	550	550	0	0	0	0	0	2,700	0
N. I. Brick Chimney Repair																
Design	10	0	0	0	0	10	0	0	0	0	0	0	0	0	10	0
Sub-total	10	0	0	0	0	10	0	0	0	0	0	0	0	0	10	0
N. I. Sludge Cross Collect.																
Construction	175	0	0	0	0	0	0	0	100	75	0	0	0	0	175	0
D. I. Elev. Water Storage Tank																
Design	150	0	0	0	0	0	50	50	50	0	0	0	0	0	150	0
Construction	2,000	0	0	0	0	0	0	0	0	0	350	1,000	300	350	2,000	0
Sub-total	2,150	0	0	0	0	0	50	50	50	0	350	1,000	300	350	2,150	0
Deer Island Odor Monitoring																
Study	15	0	0	15	0	0	0	0	0	0	0	0	0	0	15	0
Purchase	100	0	0	0	50	50	0	0	0	0	0	0	0	0	100	0
Panel	100	0	0	0	0	0	100	0	0	0	0	0	0	0	100	0
Sub-total	215	0	0	15	50	50	100	0	0	0	0	0	0	0	215	0
Oper. and Const. Coor.	1,000	0	0	0	0	150	150	100	100	100	100	100	100	100	1,000	0
D.I. Digester Oper. and Const. Review																
Consultant	140	75	13	13	13	13	13	0	0	0	0	0	0	0	65	0
D.I. Dual Fuel Engine																
Design	50	0	0	0	15	15	10	10	0	0	0	0	0	0	50	0
Construction	2,500	0	0	0	0	100	300	300	300	300	300	300	600	0	2,500	0
Sub-total	2,550	0	0	0	15	115	310	310	300	300	300	300	600	0	2,550	0
D.I. Cyclone and Grinder																
Study	100	0	0	100	0	0	0	0	0	0	0	0	0	0	100	0
Construction	258	0	0	0	258	0	0	0	0	0	0	0	0	0	258	0
Sub-total	358	0	0	100	258	0	0	0	0	0	0	0	0	0	358	0
TOTAL: WASTEWATER TREAT.	$249,804	$18,394	$4,618	$5,402	$4,659	$10,875	$15,070	$12,227	$10,016	$7,490	$7,098	$15,380	$17,556	$21,288	$131,679	$99,567

FISCAL YEAR 1987-1989
WASTEWATER CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000'S)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FY87-FY89	BEYOND FISCAL YEAR 1989
III. WASTEWATER RESIDUALS:																
Composting																
In-Vessel Study	40	13	13	14	0	0	0	0	0	0	0	0	0	0	27	0
Static Pile Study	370	270	60	40	0	0	0	0	0	0	0	0	0	0	100	0
Marketing	199	139	40	10	10	0	0	0	0	0	0	0	0	0	60	0
Sub-total	609	422	113	64	10	0	0	0	0	0	0	0	0	0	187	0
Interim Scum Mgmt. Program																
Study	65	0	65	0	0	0	0	0	0	0	0	0	0	0	65	0
Facilities Plan	310	0	150	60	60	40	0	0	0	0	0	0	0	0	310	0
Design	350	0	0	0	0	0	125	175	50	0	0	0	0	0	350	0
Construction	3,500	0	0	0	0	0	0	0	0	800	950	950	800	0	3,500	0
Resident Inspection	200	0	0	0	0	0	0	0	33	33	33	34	34	33	200	0
Sub-total	4,425	0	215	60	60	40	125	175	83	833	983	984	834	33	4,425	0
Interim Sludge Disposal																
Study	580	120	65	365	30	0	0	0	0	0	0	0	0	0	460	0
Design	350	0	0	0	0	0	325	25	0	0	0	0	0	0	350	0
Construction	6,000	0	0	0	0	0	0	500	1,500	1,500	1,000	1,000	500	0	6,000	0
Resident Inspection	300	0	0	0	0	0	0	50	50	50	50	50	50	0	300	0
Sub-total	7,230	120	65	365	30	0	325	575	1,550	1,550	1,050	1,050	550	0	7,110	0
Residual Management																
Phase I Study	535	416	119	0	0	0	0	0	0	0	0	0	0	0	119	0
Phase II Study	8,500	0	0	450	1,350	1,450	1,450	1,300	300	500	500	500	700	0	8,500	0
Land Acquisition	10,000	0	0	0	0	5,000	5,000	0	0	0	0	0	0	0	10,000	0
C.A.C.	60	0	0	5	5	5	5	5	5	5	5	5	5	10	60	0
Mid-Term Design	8,000	0	0	0	0	0	0	0	0	1,600	1,600	1,600	1,600	1,600	8,000	0
Mid-Term Const.	80,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80,000
Resident Inspection	3,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,000
Sub-total	110,095	416	119	455	1,355	6,455	6,455	1,305	305	2,105	2,105	2,105	2,305	1,610	26,679	83,000
D.I. Landfill Closure																
Construction	100	0	0	0	0	35	35	30	0	0	0	0	0	0	100	0
TOTAL: WASTEWATER RES.	$122,459	$958	$512	$944	$1,455	$6,530	$6,940	$2,085	$1,938	$4,488	$4,138	$4,139	$3,689	$1,643	$38,501	$83,000

FISCAL YEAR 1987-1989
WASTEWATER CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000'S)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FY87-FY89	BEYOND FISCAL YEAR 1989
IV. COMBINED SEWER OVERFLOWS:																
Boston Gatehouses	100	21	50	29	0	0	0	0	0	0	0	0	0	0	79	0
Commercial Point CSO Fac.																
Design	345	236	55	25	29	0	0	0	0	0	0	0	0	0	109	0
Construction	6,000	0	0	0	0	400	990	2,000	2,000	400	150	60	0	0	6,000	0
Resident Inspection	600	0	0	0	45	100	150	150	75	30	20	30	0	0	600	0
Land Acquisition	2	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0
Sub-total	6,947	236	55	25	76	500	1,140	2,150	2,075	430	170	90	0	0	6,711	0
CSO Technical Assistance																
Planning	450	0	50	75	110	110	60	30	15	0	0	0	0	0	450	0
Design	400	0	0	0	0	0	0	0	80	200	50	70	0	0	400	0
Construction	1,600	0	0	0	0	0	0	0	0	0	0	0	200	400	600	1,000
Sub-total	2,450	0	50	75	110	110	60	30	95	200	50	70	200	400	1,450	1,000
St. Mary's Street CSO																
Design	85	13	0	20	20	20	12	0	0	0	0	0	0	0	72	0
Construction	2,010	0	0	0	0	0	0	0	0	135	330	670	670	135	1,940	70
Resident Inspection	201	0	0	0	0	0	0	0	15	40	50	45	21	10	181	20
Sub-total	2,296	13	0	20	20	20	12	0	15	175	380	715	691	145	2,193	90
Somerville Marginal Rehab																
Design	176	131	5	0	0	5	5	5	5	5	15	0	0	0	45	0
Construction	1,200	0	0	0	0	0	250	250	250	250	200	0	0	0	1,200	0
Sub-total	1,376	131	5	0	0	5	255	255	255	255	215	0	0	0	1,245	0

FISCAL YEAR 1987-1989
WASTEWATER CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000'S)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FY87-FY89	BEYOND FISCAL YEAR 1989
Fox Point CSO Facility																
Land Acquisition	2	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0
Construction	4,000	0	0	0	0	370	660	1,330	1,330	170	140	0	0	0	4,000	0
Resident Inspection	400	0	0	0	0	30	70	130	100	50	20	0	0	0	400	0
Sub-total	4,402	0	0	0	2	400	730	1,460	1,430	220	160	0	0	0	4,402	0
Moon Island																
Study	280	172	50	58	0	0	0	0	0	0	0	0	0	0	108	0
Facility Plan	600	0	0	0	0	0	40	100	200	100	80	60	20	0	600	0
Design	2,000	0	0	0	0	0	0	0	0	0	0	0	100	300	400	1,600
Sub-total	2,880	172	50	58	0	0	40	100	200	100	80	60	120	300	1,108	1,600
Cottage Farm and Charles. Pump Repair																
Construction 1	467	0	0	0	0	200	267	0	0	0	0	0	0	0	467	0
Construction 2	200	0	0	0	0	0	0	120	40	40	0	0	0	0	200	0
Sub-total	667	0	0	0	0	200	267	120	40	40	0	0	0	0	667	0
Constitution Beach CSO Fac.																
Design	73	65	8	0	0	0	0	0	0	0	0	0	0	0	8	0
Construction	1,096	662	200	234	0	0	0	0	0	0	0	0	0	0	434	0
Sub-total	1,169	727	208	234	0	0	0	0	0	0	0	0	0	0	442	0
TOTAL: SEWER OVERFLOWS	$22,287	$1,300	$418	$441	$208	$1,235	$2,504	$4,115	$4,110	$1,420	$1,055	$935	$1,011	$845	$18,297	$2,690
V. WASTEWATER OTHER:																
OSHA Report Action Project																
Construction	3,750	0	0	0	0	0	0	0	1,500	750	750	750	0	0	3,750	0
Indum. Discharge Limit.	196	0	0	196	0	0	0	0	0	0	0	0	0	0	196	0
TOTAL: WASTEWATER/OTHER	$3,946	$0	$0	$196	$0	$0	$0	$0	$1,500	$750	$750	$750	$0	$0	3,946	$0

FISCAL YEAR 1987-1989
WASTEWATER CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000'S)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FY87-FY89	BEYOND FISCAL YEAR 1989
VI. FINAL PAYMENTS & RELEASE OF RETAINAGE																
Management Services			0	0	100	0	0	0	0	0	0	0	0	0	100	0
Southwest Corridor CSO			0	0	28	0	0	0	0	0	0	0	0	0	28	0
Braintree-Wey. Pump Station																
Design			0	0	23	0	0	0	0	0	0	0	0	0	23	0
Study			0	0	3	0	0	0	0	0	0	0	0	0	3	0
Sub-total			0	0	26	0	0	0	0	0	0	0	0	0	26	0
Shaft Overflow			0	0	3	0	0	0	0	0	0	0	0	0	3	0
N.I. Alternate Power			0	0	6	0	0	0	0	0	0	0	0	0	6	0
N.I. Digester Floating Covers Const.			0	0	80	0	0	0	0	0	0	0	0	0	80	0
D.I. Alternate Power			0	0	6	0	0	0	0	0	0	0	0	0	6	0
TOTAL:FINAL PAYMENTS			$0	$0	$249	$0	$0	$0	$0	$0	$0	$0	$0	$0	$249	$0
			-	-	---	-	-	-	-	-	-	-	-	-	---	-
GRAND TOTAL WASTEWATER:	$591,678	$34,064	$8,310	$11,628	$10,648	$22,650	$32,706	$25,824	$25,945	$23,145	$26,385	$33,311	$35,251	$35,887	$291,690	$266,009

WASTEWATER GRANT RECEIPTS CASH FLOW

FISCAL YEARS 1987 - 1989

WASTEWATER CAPITAL FACILITIES PROGRAM
PROJECTED QUARTERLY GRANT RECEIPT CASH FLOW (000'S)

PROJECT DESCRIPTION	TOTAL GRANT AMOUNT	PREVIOUS RECEIPTS	FISCAL YEAR 1987 JUL-SEP 1986	FISCAL YEAR 1987 OCT-DEC 1986	FISCAL YEAR 1987 JAN-MAR 1987	FISCAL YEAR 1987 APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	FISCAL YEAR 1988 OCT-DEC 1987	FISCAL YEAR 1988 JAN-MAR 1988	FISCAL YEAR 1988 APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	FISCAL YEAR 1989 OCT-DEC 1988	FISCAL YEAR 1989 JAN-MAR 1989	FISCAL YEAR 1989 APR-JUN 1989	TOTAL FY87-FY89	BEYOND FISCAL YEAR 1989
I. WASTEWATER INTERCEPTION AND PUMPING:																
Braintree-Weymouth Relief Facilities	26,838	282	0	0	0	20	31	0	0	153	153	603	1,605	1,606	4,171	22,385
Charlestown Pump Station	12,052	436	0	0	51	45	0	23	607	1,260	2,430	2,430	1,980	1,395	10,221	1,395
East Boston Pumping Station/Winthrop	26,538	995	0	0	1,031	2,025	2,019	1,861	2,782	3,053	2,901	2,712	2,646	2,458	23,488	2,055
Framinghas Extension Relief Sewer	18,355	270	0	0	200	100	100	85	0	0	0	0	0	80	565	17,520
Hinghas Pumping Station	1,694	0	0	0	25	26	0	36	216	216	306	396	216	221	1,658	36
Millbrook Valley Inter.	5,210	4,315	152	0	142	0	601	0	0	0	0	0	0	0	895	0
Reading Pumping Station Extension Relief	294	277	0	0	0	0	17	0	0	0	0	0	0	0	17	0
Wellesley Extension Replacement Sewer	30,205	330	0	0	0	160	210	126	129	0	45	45	3,656	3,656	8,027	21,848
New Neponset Valley Relief	25,182	300	0	0	0	39	85	165	158	157	158	180	180	180	1,302	23,580
Quincy Facilities Study	1,800	0	0	0	0	0	0	60	80	80	80	160	160	220	840	960
North Charles Metro Relief Sewer	405	0	0	0	0	0	0	0	0	0	0	0	81	81	162	243
Wakefield Branch and Trunk Sewers	405	0	0	0	0	0	0	0	0	0	0	0	81	81	162	243
Southern System Modeling	1,953	0	0	346	320	79	239	291	179	368	131	0	0	0	1,953	0
Deer Island Sewer System and Rehabilitation	680	0	0	0	0	0	42	43	43	38	38	26	21	15	266	414
Sewer System Metering	2,125	0	0	0	0	0	0	42	64	64	64	63	85	383	765	1,360
TOTAL: WASTEWATER INTERCEPTION & PUMPING	$153,736	$7,205	$152	$346	$1,769	$2,494	$3,344	$2,732	$4,258	$5,389	$6,306	$6,615	$10,711	$10,376	$54,492	$92,039

WASTEWATER CAPITAL FACILITIES PROGRAM
PROJECTED QUARTERLY GRANT RECEIPT CASH FLOW (000'S)

PROJECT DESCRIPTION	TOTAL GRANT AMOUNT	PREVIOUS RECEIPTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FY87-FY89	BEYOND FISCAL YEAR 1989
II. WASTEWATER TREATMENT:																
Deer Island Pump and Power Station	26,189	486	0	0	2,268	2,412	2,232	3,582	6,102	3,312	1,242	756	477	558	22,941	2,762
D. I. Chlorination Facility Rehabilitation	2,083	0	0	0	0	0	239	374	731	365	187	93	94	0	2,083	0
D. I. Sludge Thicken Rebuild	1,350	92	0	212	371	540	135	0	0	0	0	0	0	0	1,258	0
D. I. Electrical Upgrade	1,913	60	0	0	61	641	276	277	276	161	161	0	0	0	1,853	0
D. I. Sed. Tank System	10,876	0	0	0	0	0	0	333	802	1,190	1,785	1,190	1,079	1,079	7,458	3,418
D. I. Remote Headworks	18,359	0	0	0	0	0	394	2,638	2,244	2,193	2,193	2,184	2,185	2,221	16,252	2,107
Nut Island Upgrade	5,592	4,749	147	0	0	0	0	200	496	0	0	0	0	0	843	0
D. I. Facility Plan	97,668	0	0	0	219	425	425	425	425	425	425	425	335	419	3,948	93,720
Water Trans. Fac. (Pier)	30,150	0	0	0	0	0	0	540	720	720	360	495	135	7,335	10,305	19,845
TOTAL WASTEWATER TREAT:	$194,180	$5,387	$147	$212	$2,919	$4,018	$3,701	$8,369	$11,796	$8,366	$6,353	$5,143	$4,305	$11,612	$66,941	$121,852
III. WASTEWATER RESIDUALS:																
Residual Management	6,275	282	0	0	0	0	1,043	1,044	1,044	936	216	360	360	360	5,363	630
TOTAL: WASTEWATER RESIDUALS	6,275	282	0	0	0	0	1,043	1,044	1,044	936	216	360	360	360	5,363	630
IV. COMBINED SEWER OVERFLOW																
Boston Gatehouses	75	0	0	0	0	30	30	15	0	0	0	0	0	0	75	0
Commercial Point CSO Fac	6,069	0	0	0	0	0	104	515	1,026	1,935	1,868	387	153	81	6,069	0
CSO Technical Assistance	1,200	0	0	0	0	37	55	55	30	15	48	100	25	25	400	800
St. Mary's Street CSO	1,548	0	0	0	0	0	0	0	0	0	11	122	266	500	899	649
Fox Point CSO Facility	3,960	0	0	0	0	0	0	360	657	1,314	1,287	198	144	0	3,960	0
Moon Island	2,591	88	0	0	0	142	21	0	36	90	180	90	72	54	685	1,818
Constitution Beach CSO Facilities	1,018	52	257	52	180	211	266	0	0	0	0	0	0	0	966	0
TOTAL: SEWER OVERFLOWS	$16,461	$140	$257	$52	$180	$420	$476	$945	$1,749	$3,354	$3,354	$897	$660	$670	$13,054	$3,267
GRAND TOTAL SEWERAGE:	$370,652	$13,014	$556	$610	$4,868	$6,932	$8,564	$13,090	$18,847	$18,045	$16,269	$13,015	$16,036	$23,018	$139,850	$217,788

WATERWORKS

WATERWORKS FACILITIES PROGRAM
AND
CAPITAL EXPENDITURE BUDGET
FY 1987 - 1989

Introduction

The Authority's Waterworks Division is responsible for operation and maintenance of the water delivery system. The system currently serves 45 communities for a total population served of approximately 2 million people.

The Division operates and maintains 129 miles of aqueducts and tunnels, 4 hydroelectric power stations, 11 chemical feed stations, 260 miles of distribution pipelines, 12 distribution pump stations, 16 distribution reservoirs and numerous buildings, dams, roads and other facilities. At this time, the Waterworks Division is also operating the Clinton Wastewater Treatment Plant.

The Waterworks Division is responsible for identification of the system's capital needs. The Engineering Division is responsible for planning and design of major capital improvements. The Construction Division is responsible for construction of these improvements.

Capital Budget Summary

The Waterworks Facilities Program and Capital Expenditure Budget for FY 1987 to FY 1989 includes proposed outlays of $43.7 million. This figure includes the cost for current contractual commitments and for future phases scheduled during the three year time period.

The Waterworks Facilities Program includes proposed outlays in four program categories: water supply and treatment, transmission, distribution and pumping, and other capital projects. Table I presents the three year project expenditures in each of the four program categories. Retainage payments due for completed contracts are also shown. These figures represent the actual expenditure cash flow required during the three-year budget period. Expenditures beyond FY 1989 will be required to complete projects. It is anticipated that an additional $86.3 million beyond the $43.7 million will be necessary for completion of all projects.

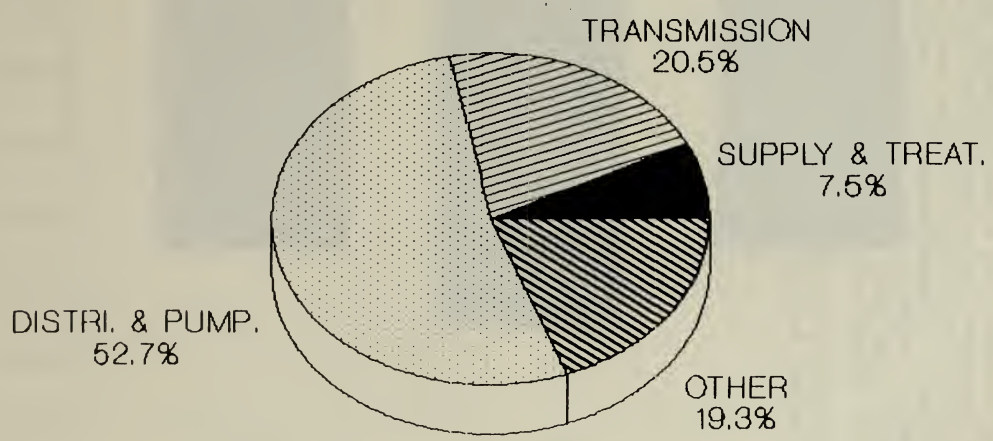
Descriptions of the individual capital projects in each program category follow this summary. A detailed expenditure cash flow for the Waterworks Facilities Plan appears following the project descriptions.

TABLE 8

WATERWORKS FACILITIES PROGRAM
AND
CAPITAL EXPENDITURE BUDGET
FY 1987 - 1989
(000's)

Program Category	FY87	FY88	FY89	FY87-89 Total	Beyond 1989
Supply and Treatment	$1,168	$875	$1,229	$3,272	$31,925
Transmission	278	3,340	5,323	8,941	4,470
Distribution & Pumping	4,427	7,109	11,432	22,968	40,065
Other Capital Projects	88	3,912	4,438	8,438	9,845
Retainage	58	0	0	58	0
Total	$6,019	$15,236	$22,422	$43,677	$86,305

WATERWORKS FACILITIES PROGRAM
FY87-89 CAPITAL EXPENDITURE BUDGET

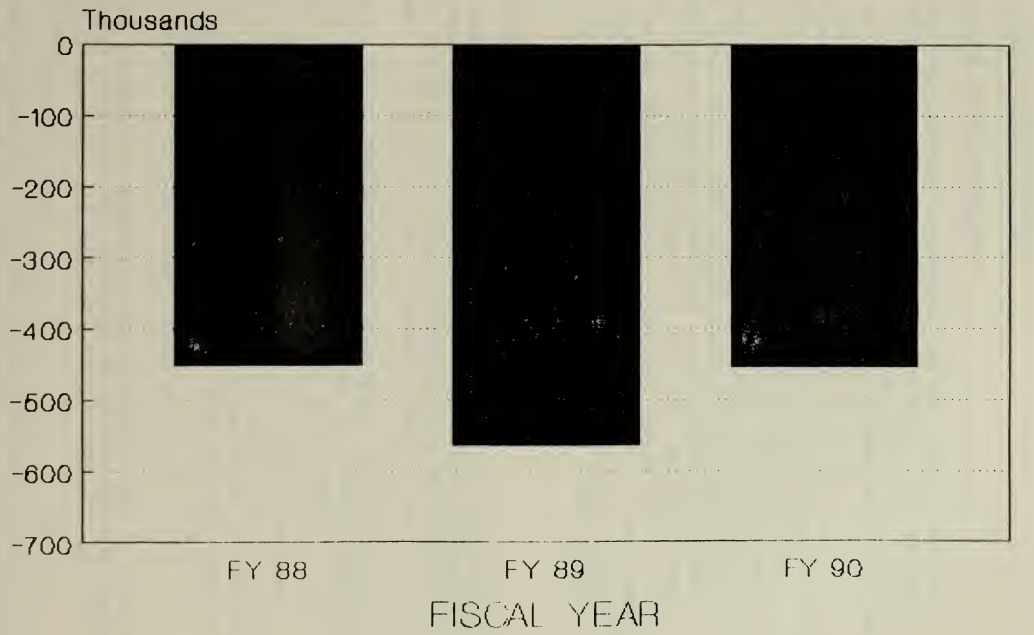


Current Expense Budget Impact

The Capital Budget will have a substantial impact upon the operating revenues and expenditures of the Authority. Revenues will be increased due to generation and sale of hydroelectric power at the Oakdale Power Station and the Aqueduct Transfer Hydrogenerator. Expenditures will increase to staff and operate the Sudbury Treatment Plant and Norumbega Chlorination Facility. New expenditures will also be incurred to operate the new Central Monitoring System and Revenue Meters.

The accompanying chart shows the expected impact on the Current Expense Budget for FY 1988 - FY 1990.

WATERWORKS DIVISION
CUMULATIVE CURRENT EXPENSE BUDGET IMPACT



SUPPLY AND TREATMENT

Long-Range Water Supply Study

Description and Justification

The Authority has access to several major supply sources, including Quabbin Reservoir, the Ware River, and Wachusett Reservoir. Currently, the supply system is consistently providing more water than can safely be drawn for an extended period of time. In order to prevent serious water supply problems, the Long-Range Water Supply Study has been initiated to estimate future water needs of the Authority's service area and to suggest alternatives for both demand management and augmentation of the supply system so that supply is sufficient to meet the projected need. The study examines the water needs of the service area from 1980 to the year 2020. Nine alternatives are assessed from capital cost and environmental impact viewpoints. The nine alternatives are: No Action, Demand Management Water Conservation, Watershed Management, Local Water Supplies, Upper Sudbury Watershed, Connecticut River, Merrimack River, Millers/Tully River, and Plymouth Aquifer. The study will serve as an Environmental Impact Report upon completion.

Project Status and Schedule

The study began in 1982 under the direction of the Metropolitan District Commission. Detailed reports have been issued on future demand projections, safe yield analysis, and all nine alternatives. In April, 1986 a summary report was released.

Over the past year, the Authority has begun developing and implementing water conservation programs in demand management, leak detection, meter modernization and pipe repair. In addition, the MWRA Board of Directors has determined that further analysis is required for five local water supply source alternatives. This work is scheduled to begin in the Spring of 1987 and will cost $250,000. The Board has also requested that the study projections and database be updated from 1980 to 1985. This task, combined with the remaining EIR work, adds an additional $600,000 to the study cost.

The Board is presently reviewing the entire study and inviting public comment prior to any further decisions concerning water supply. It is anticipated that the final EIR will be published in June, 1988.

The Long-Range Water Supply Study also includes an advisory committee as mandated by the Massachusetts Environmental Policy Act for major and complicated projects. The Water Supply Citizens Advisory Committee (WSCAC) serves in this capacity. There is an existing agreement with the Pioneer Valley Planning

Commission for the Authority to supply operating funds for WSCAC. The funds under this agreement will be depleted by December, 1986. In order for WSCAC to continue to advise the Authority throughout the EIR process, a new agreement beginning in January, 1987 and ending in June, 1988 is required.

The Engineering Division will be responsible for the remaining phases of the Long-Range Water Supply Study.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	Wallace, Floyd	5001	$5,797,000	$4,217,000	$1,580,000
Local Sources To Be Selected			250,000	0	250,000
WSCAC	Pioneer Valley	5000	117,700	59,300	58,400
WSCAC	Pioneer Valley	5002	128,700	0	128,700
Total			$6,293,400	$4,276,300	$2,017,100

Authority Share

$6,293,400 (100%).

Current Expense Budget Impact

Operational costs will be estimated when and if a major alternative requiring operational facilities is chosen by the Board of Directors. All water conservation projects to date have been capitalized. Any operational impact of these projects is detailed in the individual project summaries appearing in this document.

Sudbury Reservoir Treatment Plant Reactivation

Description and Justification

The Sudbury Reservoir has been part of the MDC water supply system since its construction in the 1890's, but became inactive due to water-quality problems. Reactivation of the reservoir would increase the water supply by 17 million gallons per day. This project is the only short-term action available to the Authority that would add to supply. All other options to increase supply will require a long-term, multi-year implementation schedule.

Reactivation will necessitate construction of a water treatment facility in order to meet current water quality regulations. The water rights are already available to the Authority. The water from the treatment plant would discharge into the existing Weston

Aqueduct, which is adjacent to the plant site. The treatment plant is expected to have a useful life of thirty years.

Project Status and Schedule

The reactivation project requires six phases. A draft EIR was prepared and approved by the MDC Commissioners. The final EIR is scheduled to be completed in February, 1987. The EIR process will entail numerous permits and approvals including MEPA, DEQE, and the Massachusetts Legislature. It is estimated that design can commence in September, 1988 and conclude in September, 1990. Construction of the treatment plant could begin in September, 1990 and be complete in September, 1992.

The treatment plant will produce 352 tons of dry solids per year as a result of the water treatment process. This treatment by-product requires additional project phases to study, design and construct disposal facilities. The study phase is scheduled to begin in December, 1987 and conclude in September, 1989. Design work would begin in October, 1989 and last seven months. Construction can then begin in December, 1990 and be completed by the September, 1991.

The Engineering Division will be responsible for the remaining design phases of the Sudbury Reservoir Treatment Plant Reactivation project. The Construction Division will assume responsibility upon award of a construction contract.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
EIR	Parsons,Brink.	5015	$500,000	$421,206	$78,794

Design	To Be Selected	2,500,000	0	2,500,000
Constr.	To Be Selected	28,000,000	0	28,000,000
Sludge-Study	To Be Selected	200,000	0	200,000
Sludge-Design	To Be Selected	150,000	0	150,000
Sludge-Construction	To Be Selected	2,000,000	0	2,000,000
Total		$33,350,000	$421,206	$32,928,794

Authority Share

$33,350,000 (100%)

Current Expense Budget Impact

The annual increase in the Current Expense Budget is anticipated to be as follows:

Wages	$208,000
Chemicals	290,000
Utilities	83,000
Other Materials	338,000
Total	$919,000

The $338,000 cost of materials is for annual replacement of granular activated carbon. Since the plant is scheduled to be functional as of September, 1992, the FY93 budget is expected to increase by $776,000. The remaining $153,000 will impact FY94.

Existing Water Sources Treatment Study

Description and Justification

In June, 1986 the Safe Drinking Water Act was amended to strengthen the quality standards for water supplies. As part of these amendments, the U.S. Environmental Protection Agency is required to promulgate regulations for the treatment of surface water supplies. The EPA is required to have final regulations 18 months after passage of the act. The states will then have 18 months to adopt the regulations and 12 months to determine which surface water supplies will require treatment. As part of these regulations, criteria will be established, that must be complied with, for a surface water supply to be given exemption from treatment. To meet the new standard, it is likely that the MWRA's surface supplies will require treatment. The Authority has seven active surface reservoirs that are untreated and would be covered by the new regulations. They include the Quabbin, Wachusett, Weston, Norumbega, Nash Hill, Fells and Spot Pond reservoirs.

Treatment may also be necessary at Quabbin Reservoir, regardless of the new regulations, if the reservoir is drawn down to minimum pool in order to increase the yield. The Long-Range Water Supply Study suggests that this is one impact of the "No Action" alternative. The draw down would add thirty million gallons a day to current yield, but the water quality would be unreliable.

The proposed study would investigate the need, feasibility and benefits of treating existing surface water supplies. The study would provide baseline data to the Executive Director and Board of Directors regarding future policy decisions on water supply treatment. The study would also provide an analysis of current water quality which could be used to decide whether a waiver of the treatment regulations should be pursued by the Authority.

Project Status and Schedule

The project has only a study phase at this time. Future phases, if any, depend on the study findings. The study is scheduled to begin in October, 1987 and will be the responsibility of the Engineering Division.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	To Be Selected		$250,000	0	$250,000

Authority Share

$250,000 (100%)

Current Expense Budget Impact

This project will not impact the Current Expense Budget until individual treatment decisions are made and implemented.

TRANSMISSION

Hultman - Weston Aqueduct Transfer for Hydropower

Description and Justification

This project combines improvements to the connection between the Hultman and Weston Aqueducts and the installation of hydropower equipment to take advantage of the pressure drop from the high pressure Hultman to the low pressure Weston. The hydropower equipment will utilize the seventy to eighty foot difference in the operating levels of the two aqueducts to produce approximately 750 kilowatts per year which will generate $390,000 in annual revenue for the Authority. The electricity can be used to meet the power needs of the Sudbury Reservoir Treatment Plant when it becomes operational in 1992.

The construction will include modification of existing pipelines which now connect the Hultman and Weston aqueducts and installation of a new turbine, generator and controls in the existing Weston Aqueduct head chamber. The project requires installation of remote control and monitoring equipment at Clinton and Southborough.

The project also includes a construction contract for piping modifications and replacement of valves and meters. These improvements are necessary to increase flow through the new turbine resulting in additional revenue.

It is expected that the new facilities will have a useful life of twenty years.

Project Status and Schedule

The project consists of two design and two construction phases. The first design contract was awarded in 1982 for the hydropower portion of the project. The design is complete and the construction phase has been delayed pending the issuance of a license from the Federal Energy Regulatory Commission for the hydrogenerator. It is anticipated that the license will be awarded in the Fall of 1986. Since the construction phase requires that the Weston Aqueduct be shut down to permit construction of the new connection, the work can occur only in the low-flow months in the winter. It is anticipated that purchasing of equipment will begin in the Summer of 1987 so that construction can begin in October, 1987 and be complete in October, 1988.

The second design contract for the piping modification work is scheduled to begin in September, 1987 and conclude in June, 1988. Construction will begin in December, 1988 and conclude in June, 1989.

The Engineering Division will oversee the project up to the constuction phase, at which point the Construction Division will assume responsibility.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design 1	Internat. Elec.	5030	$325,000	$236,738	$88,262
Design 2	To Be Selected		60,000	0	60,000
Constr.1	To Be Selected		2,800,000	0	2,800,000
Constr.2	To Be Selected		500,000	0	500,000
Total			$3,685,000	$236,738	$3,448,262

Authority Share

$3,685,000 (100%).

Current Expense Budget Impact

The hydropower facility will impact the FY 1989 Current Expense Budget on an annual basis as follows:

Revenue	($244,000)
Wages	36,000
Maintenance	12,000
	($196,000)

Since the facility will come on line in October, only seven months of revenue and expense will be realized in FY 1989. The impact for FY89 will be net revenue of $114,300.

Norumbega Reservoir Chlorination Facility

Description and Justification

Norumbega is an active distribution reservoir which serves as the disinfection center for over eighty-five percent of the water supply for the MWRA service area. The existing chlorination facility at Norumbega was constructed in 1940 and is at the end of its useful life. The current facility is also considered inadequate to ensure the safe handling of chlorine gas.

This project includes a study of the effectiveness of the Waterworks Division's present chlorination practice, and design and construction of a new chlorination facility adjacent to the current chlorination building.

The new facility is expected to have a useful life of twenty years.

Project Status and Schedule

The study and design phases of the project are complete. The study findings have been reviewed by the Department of Environmental Quality Engineering, and approval to proceed with construction has been granted. Construction is expected to begin in June, 1987 and be completed in one year.

The Waterworks Division will oversee the project up until a construction contract is awarded. The Construction Division will oversee constuction.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Constr.	To Be Selected		$700,000	0	$700,000

Authority Share

$700,000 (100%).

Current Expense Budget Impact

This project is expected to impact the Current Expense Budget as follows:

Wages	$54,000
Utilities	79,000
Maintenance	57,000
	$190,000

Since the new chlorination building will be operational in July, 1988, the FY 89 Current Expense Budget will increase by $190,000.

Supplemental Pressure Aqueduct

Description and Justification

The water delivery system of the Massachusetts Water Resources Authority depends on a system of tunnels and aqueducts which transport water from Quabbin and Wachusett Reservoirs to the distribution reservoirs in western metropolitan Boston. The current tunnels and aqueducts are deficient in two respects. First, the transmission system is unable to supply sufficient hydraulic capacity during peak flow periods which leads to pressure deficiencies in all high service areas during the summer months. Second, key sections of the transmission system such as the Hultman Aqueduct rely on a single pipeline.

The fact that only one pipeline exists means that the pipeline cannot be shut down for maintenance, and any serious failure of that pipeline would result in disruption of service. For example, if the flow in the Hultman Aqueduct were interrupted, eighty-five percent of the water supply for the district would be endangered.

This project is a study of engineering alternatives and environmental issues concerning development of a supplemental pressure aqueduct. An environmental impact report will also be prepared prior to further decisions regarding design and construction of a supplemental pressure aqueduct.

Project Status and Schedule

The study began in June, 1984 and will be completed in October, 1987. The study will explore and evaluate the engineering alternatives based on feasibility and cost criteria. The EIR will then focus on the feasible alternatives and is scheduled to begin in July, 1988 and conclude in July, 1989.

The project will be the responsibility of the Engineering Division.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	Anderson,Nichols	5043	$368,000	$217,529	$150,471
EIR	To Be Selected		$4,000,000	0	4,000,000
Total			$4,368,000	$217,529	$4,150,471

Authority Share

$4,368,000 (100%).

Current Expense Budget Impact

No impact until an alternative is chosen and implemented.

Cosgrove Intake Turbine Repair

Description and Justification

The Cosgrove Intake at Wachusett Reservoir is a facility which combines generation of hydroelectric power with induction of water from the reservoir to the Cosgrove Aqueduct. The intake has two generators, one of which is out of service pending repairs. The Kaplan Vertical Hydro-Electric Generator needs blade repair and the hydraulic capacity of the passages must be improved.

The repaired generator is expected to have a useful life of twenty years.

Project Status and Schedule

Construction began in August, 1985 and was completed in July, 1986. Final payment and release of retainage is scheduled in the first and second quarters of FY 1987.

The Constuction Division is responsible for overseeing the repair contract.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Constr.	Dresser Ind.	5228	$249,131	$112,219	$136,912

Authority Share

$249,131 (100%).

Current Expense Budget Impact

Repair of the generator allows for resumption of generation of hydroelectric power. The revenue is credited to the Authority's fifty percent share of the MDC Watershed Management Operating and Maintenance Budget. The revenue for FY 1987 has therefore been budgeted in the MWRA's FY 1987 Current Expense Budget as a reduction to the Watershed Reimbursement cost. No further impact is anticipated.

Oakdale Power Station Generator Repair

Description and Justification

The Oakdale Power Station is located at the discharge point of the Quabbin Aqueduct to the Wachusett Reservoir. The General Electric Hydrogenerator is currently shut down due to a short in the wiring, resulting in a peak-flow period loss of $15,000 per week in revenue. The generator now requires repair, cleaning and testing, and adjustment to the existing meter, relays and circuit breakers. This will permit greater flow and reservoir elevation control and resumption of hydroelectric power generation.

The electrical transmission substation connecting the Oakdale Power Station to the New England Power Company Transmission lines has also sustained damage due to a power overload. As a result, the substation is unable to disharge its output into the power grid. The substation metering and transformer system must be replaced.

The transformers inside the Power Station are forty years old and at the end of their useful lives. The transformers contain low level PCBs which pose a potential threat to the water supply. These transformers will also be replaced.

It is anticipated that the repairs will extend the useful life of the generator, substation and transformers to twenty years.

Project Status and Schedule

The project consists of six phases. Inspection of the generator is scheduled for February, 1987. Repair of the generator will begin in May, 1987 and will be completed in November, 1987. Design of the substation repairs will begin in March, 1987 and be completed in April, 1987. Substation construction is anticipated to begin in July, 1987 and be finished in September, 1987. Design of the transformer replacement will start in June, 1987 and end in July, 1987. The transformer construction phase will begin in September, 1987 and be completed by November, 1987.

The Waterworks Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Inspection	To be Selected	5230	$ 10,000	0	$ 10,000
Repair	To be Selected	5231	350,000	0	350,000
Design 1	To be Selected	5232	15,000	0	15,000
Constr.1	To be Selected	5233	75,000	0	75,000

Design 2	To be Selected	5234	15,000	0	15,000
Constr.2	To be Selected	5235	75,000	0	75,000
Total			$540,000	0	$540,000

Authority Share

$540,000,(100%).

Current Expense Budget Impact

Revenue from hydroelectric power is credited toward the Authority's fifty percent share of the MDC Watershed Division's Operating and Maintenance Budget. The projected annual revenue of $450,000 will be reflected as a reduction to the FY 1988 Watershed Reimbursement cost which will be contained in the Authority's Current Expense Budget.

Echo Bridge Rehabiliation

Description and Justification

Echo Bridge carries the Sudbury Aqueduct across the Charles River. It was constructed in the 1870's and was patterned after the old Roman aqueducts consisting of a series of arched spans. The structure is a National Historic Landmark. The aqueduct bridge is constructed of concrete masonry with brick facing. The brick mortar has deteriorated and the ties which secure the facing to the structure are failing.

The project consists of repointing the brik facade and replacement of ties.

It is expected that the rehabilitation will extend the useful life of the bridge by twenty years.

Project Status and Schedule

The project will have design and construction phases. Design work will begin in April, 1987 and last two months. Construction is scheduled to begin in April, 1988 and be finished in June, 1988.

The Waterworks Division will be responsible for this Project.

Project Status and Schedule

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	To Be Selected		$ 25,000	0	$ 25,000
Constr.	To Be Selected		200,000	0	200,000
Total			$225,000	0	$225,000

Authority Share

$225,000 (100%)

Current Expense Budget Impact

None.

Sluice Gate Rehabilitation

Description and Justification

MWRA Waterworks Division is responsible for maintenance and operation of sluice gates at reservoir intakes throughout the system. The existing gates are typically 80-100 years old, are in poor condition, and must be operated by hand. Problems include gate leakage and corroded tracks which can prevent the gate from being operated. The sluice gates regulate water supply intake and release to downstream rivers in accordance with both legislative and flood control requirements. In a recent Dam Safety Inspection Report by the Army Corps of Engineers, the sluice gates at Wachusett Reservoir and the four Sudbury System Reservoirs were cited as needing sluice gate repairs to restore operability for flood control use. Failure to make repairs could lead to downgrading of future Corps dam safety assessments at these sites. Other distribution reservoir sites such as Spot Pond and Fells Reservoir intakes also need sluice gate rehabilitation to improve operations.

The project includes replacement of the gates and sliding tracks. New motorized operators will also be installed which will require an upgrade of the gate houses consisting of structural improvements, power supplies, controls, HVAC work and security improvements. The sites include 8 gates at Wachusett Reservoir, 6 gates at Sudbury Reservoir, 23 gates at Framingham Reservoirs 1, 2, and 3, and approximately 30 gates at various distribution reservoirs.

The sluice gates are expected to have a useful life of twenty years.

Project Status and Schedule

Design work will be done in-house. The project will entail four construction phases. The sudbury Reservoir construction is scheduled to begin in January, 1988 and be completed by January, 1989. The Wachusett Reservoir construction will begin in July 1988 and finish in July, 1989. Construction for the Framingham Reservoirs is expeted to begin in January, 1989 and conclude in January, 1990. The distribution reservoirs construction will begin in July, 1989 and be completed in July, 1990.

The Waterworks Division will be responsible for this project up until construction contract award. The Construction Division will oversee the construction phases.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Constr.1	To Be Selected		$ 550,000	0	$ 550,000

Constr.2	To Be Selected	850,000	0	850,000
Constr.3	To Be Selected	1,200,000	0	1,200,000
Constr.4	To Be Selected	1,600,000	0	1,600,000
Total		$4,200,000	0	$4,200,000

Authority Share

$4,200,000 (100%)

Current Expense Budget Impact

The project will result in a minimal energy cost at the Reservoir gate house sites due to the new sluice gate motors. Annual power costs are estimated to be less than $1,000 per site. (Contract 1 - 1 site, Constract 2 - 1 site, Contract 3 - 3 sites, Contract 4 - 6 sites).

DISTRIBUTION AND PUMPING

Water Distribution System Master Plan

Description and Justification

The MWRA Waterworks System includes approximately 260 miles of distribution pipelines, 129 miles of aqueduct and various pumping, hydoelectric, chemical feed and other facilities. Future plans for the aqueduct system are currently being studied in the Supplemental Pressure Aqueduct Project. In the distribution system, a variety of rehabilitation and new pipeline projects are underway in response to specific delivery problems.

However, the distribution system has not recently undergone a comprehensive evaluation which would form the basis of a master plan. This project consists of an assessment of all ongoing distribution system projects and evaluation of long term needs. The assessment and evaluation will provide a basis for integrated planning and improved capital plan sequencing. Specific areas of study will include the interface of new aqueducts with the existing distribution system, computer modeling of planned improvements, identification and assessment of long-term infrastructure replacement needs, an energy conservation program and development of a replacement program for mechnical and electrical operating equipment.

Project Status and Schedule

The study is scheduled to start in July, 1987 and will be completed in one year.

The Engineering Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	To Be Selected		$ 250,000	0	$ 250,000

Authority Share

$250,000 (100%).

Current Expense Budget Impact

The project is unlikely to affect annual operating costs with the possible exception of future reductions in pumping energy resulting from improved efficiency.

Spot Pond Pump Station Rehabilitation

Description and Justification

The pump station at Spot Pond is responsible for chlorinating and pumping water from the pond to the Bearhill Standpipe and the Northern High Service distribution pipeline. The station was built in 1905. Due to the age and condition of the facility, the rehabilitation of the pump station is a top priority of the Waterworks Division.

The project includes three work items. The electrical system will be upgraded to provide power for the 300 HP and 500 HP engines recently added for pumping to the Bearhill Standpipe. This work includes site preparation, masonry work, and new conduits and control panels.

The second work item is construction of chlorination and caustic soda handling facilities to replace the shed currently used to store chlorine and the temporary tank for caustic soda. The new facility will increase the storage capacity of the station and therefore allow greater bulk purchasing. In addition, the new facility will require less frequent handling of chemical containers by MWRA staff, resulting in safer working conditions.

The third work item is rehabilitation of the building itself, including space for a new office facility for the twelve MWRA staff assigned to Spot Pond.

The expected useful life of the new facilities is twenty years.

Project Status and Schedule

Design of the electrical upgrade began in May, 1984 and is complete. Construction began in August, 1986 and is scheduled to be complete in April, 1987. The Construction Division will oversee the construction phase.

The chemical handling facility and building repairs will be combined into one work item. Design is scheduled to begin in May, 1987 and finish in December, 1987. Construction will begin in January, 1988 and be complete in June, 1989. The Engineering Division will be responsible for these phases up to construction contract award.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
El.Upgrade	Richardson	5076	$140,864	0	$140,864
Design	To Be Selected		350,000	0	350,000
Constr.	To Be Selected		2,200,000	0	2,200,000
Total			$2,690,864	0	$2,690,864

Authority Share

$2,690,864 (100%).

Current Expense Budget Impact

None.

Commonwealth Avenue Pump Station Modernization

Description and Justification

The Commonwealth Avenue Pump Station is a thirty year old facility serving Newton which is staffed one shift per day. When unattended, the station cannot be monitored or controlled from a remote location. The station's three electric pumps and motors are undersized and nearing the end of their useful lives. The facility is also susceptable to power failure which can result in interruptions in service.

This project consists of constructing a new building adjacent to the existing pump station which will house a new diesel generator and three new 12 mgd pumps and electric motors. The new motors will provide increased pumping capacity to meet present and projected future needs. The pump station will be modernized by adding monitoring equipment, ventilation and a security system.

The modernized pump station is expected to have a useful life of twenty years.

Project Status and Schedule

Design is scheduled to begin in October, 1988 and will take eleven months to complete. Construction will begin in April, 1990 and last ten months. The Engineering Division will be responsible for this project up until award of a construction contract.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	To Be Selected		$75,000	0	$75,000
Constr.	To Be Selected		$1,200,000	0	$1,200,000
Total			$1,275,000	0	$1,275,000

Authority Share

$1,275,000 (100%).

Current Expense Budget Impact

None.

Lexington Street Pump Station

Description and Justification

The Lexington Street Pump Station provides the water supply to the Stearns Hill section of Waltham. The station has a pumping capacity of 2.7 million gallons per day (mgd). The average demand of the service area is 4.6 mgd, with peak demand of 8 mgd. Future demand is projected to be 6.8 mgd on average and 11.9 at peak periods by the year 2020.

The present 1.9 mgd average day deficiency is met by a connection to the Northern Extra High Service System. Water must travel from Waltham to a pump station in Arlington in order to be pumped to an elevated tank in Lexington, from which it then flows by gravity to a connection in Waltham. It will be more efficient to simply pump the water at Lexington Street in Waltham.

To meet current and projected demand, the pumping units at Lexington Street will be replaced with three new 7 mgd units. Related electrical gear and appurtenances will be installed. Construction will also include 1600 linear feet of piping to provide adequate suction and discharge mains for the new pumping units.

To ensure continuous service during the construction period, the project will also provide for a temporary pumping station.

The facility is expected to have a useful life of twenty years.

Project Status and Schedule

Design will begin in November, 1987 and finish in September, 1988. Construction will begin in March, 1988 and last eighteen months.

The Engineering Division will be responsible for this project until a construction contract is awarded.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	To Be Selected		$200,000	0	$200,000
Constr.	To Be Selected		1,700,000	0	1,700,000
Total			$1,900,000	0	$1,900,000

Authority Share

$1,900,000 (100%).

Current Expense Budget Impact

None.

Northern Intermediate High Service Distribution Improvements

Description and Justification

The Northern Intermediate High Service is a component of the Northern High Service which supplies water to Stoneham and Woburn. This service area suffers from inadequate pressure due to limited pumping and pipeline capacity. Wakefield and Winchester also experience chronic low pressure problems due to the location of existing connections.

In general, the high ground elevation areas, where pressures are the most critical, are in the northern sections of these towns and are only reached through small diameter pipelines with large pressure losses. Peak day pressures are especially deficient in these high elevation areas which poses a risk to firefighting ability.

The proposed project extends and increases the capacity of the Authority pipelines and connection points to reach the critical pressure areas of these towns. The project has four construction phases. The first phase involves constuction of 20 and 24 inch pipelines in Stoneham. The second phase is construction of a six million gallon standpipe at Bearhill. The third phase consists of construction of 18,000 linear feet of 36, 24 and 20 inch pipeline in Woburn and Stoneham. The last phase is a 36 inch pipe bridge to cross Route 95.

Project Status and Schedule

The design work began in May 1981 and is complete except for the Route 95 pipe bridge. The first Stoneham construction phase is complete. The Bearhill Standpipe is also complete. The construction contract for the Woburn and Stoneham pipeline was awarded in August, 1986 and will be complete in March, 1988. The Interstate 95 construction will begin in September, 1987 and be complete in March, 1988.

The Waterworks Division is responsible for all pre-construction phases. The Construction Division oversees the construction phases.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	Keyes Assc.	5105	$782,098	$605,372	$176,726
Constr.1	Paonessa	5106	154,582	139,582	15,000
Constr.2	Natgun	5107	4,087,086	3,945,947	141,139
Constr.3	Caliacco	5108	5,238,481	0	5,238,481
Constr.4	To Be Selected		1,000,000	0	1,000,000
Total			$11,262,247	$4,690,901	$6,571,346

Authority Share

$11,262,207 (100%)

Current Expense Budget Impact

None.

Northern High Service Pipe Improvements - Lynn Pipeline

Description and Justification

The Northeast corner of the Northern High Service area serves Marblehead, Swampscott, Nahant, Peabody and Lynn. The existing pipelines are undersized for the current peak demand of the city and towns. Upgrading the service requires laying new pipe in the City of Lynn. The project entails furnishing and laying of 37,500 linear feet of 48, 36, and 24 inch ductile-iron or reinforced concrete and steel pipe encased in concrete. The materials to be furnished include pipes, valves and related appurtenances.

The pipeline in expected to have a useful life of fifty years.

Project Status and Schedule

The project has three construction phases. The first phase consisting of 15,000 linear feet of pipeline through Saugus is complete.

The second phase is construction of 7,500 linear feet of pipeline through Lynn. Construction of this phase is underway, but has been delayed due to the discovery of hazardous materials in the soil of the pipeline path. Further design work is now necessary to remove the contaminated soil. This construction phase has also been delayed by settlement of contractor claims for additional work items. The claim was settled in August, 1986, clearing the way for resumption of construction of the remaining 1,200 feet, exclusive of pipe in the hazardous waste area.

The final two phases of the project entail design and construction of the remaining 15,000 linear feet of pipeline through Lynn.

The Construction Division is responsible for phase two of pipeline construction. The Engineering Division will oversee the design and construction contract award of phase three.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design 2	LEA	5113	373,400	266,365	107,035
Constr.2	Biotti	5115	4,162,026	2,595,890	1,566,136
Design 3	To Be Selected		30,000	0	30,000
Design 4	To Be Selected		300,000	0	300,000
Constr.3	To Be Selected		6,000,000	0	6,000,000
Total			$10,865,426	$2,862,255	$8,003,171

Authority Share

$10,865,426 (100%)

Current Expense Budget Impact

None.

Boston Low Service Pipe Rehabilitation

Description and Justification

The Boston Low Service pipeline serves downtown Boston and surrounding areas. Water delivered by this service accounts for fifteen percent of MWRA use. The Boston Low Service contains over twenty miles of old 48 and 60 inch cast iron pipe. The pipes were laid in the 1800's before cars and trolleys. As a result, the pipes are subject to a disproportionate share of major breaks due to both their age and extreme surface loadings.

This project consists of assessing the condition of the Boston Low Service system and either replacing or rehabilitating existing sections of pipe as necessary. The study phase will determine the structural integrity of the pipe, bedding material condition, and the extent of pipe corrosion. Exploratory excavations will be done in the Town of Brookline to expose cast-iron pipes at up to ten sites. The sites will be representative of conditions in the overall Boston Low Service. The study findings will be used to develop the pipe replacement or rehabilitation plan.

Project Status and Schedule

The study contract was awarded in September, 1984 and is scheduled to be completed in August, 1987. The exploratory excavations using test pits will be a separate project phase beginning in August, 1987 and finishing in October, 1987. Design will begin in October, 1988 and last thirteen months. The construction phase can begin in October, 1989 and conclude in October, 1991.

The Waterworks Division will oversee the study phase of the project. The Engineering Division will be responsible for design and construction contract award.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	Black & Veatch	5120	$328,261	$35,000	$293,261
Test Pits	To Be Selected		100,000	0	100,000
Design	To Be Selected		600,000	0	600,000
Constr.	To Be Selected		10,000,000	0	10,000,000
Total			$11,028,261	$35,000	$10,993,261

Authority Share

$11,028,261 (100%)

Current Expense Budget Impact

None.

Hyde Park Pipe Replacement

Description and Justification

This Hyde Park pipeline services Milton, Hyde Park and West Roxbury. It is a 1900 vintage, unlined 20 inch cast-iron pipe. The existing pipe has had numerous breaks and has very high maintenance costs. The major problem is that the pipe is inadequate for the pressure level required to ensure service delivery. To avoid breaking the pipe, the Hyde Park Pump Station must reduce its output pressures below the level necessary for adequate service.

The project consists of replacing 5,000 linear feet of pipeline and upgrading to 24 inch pipe. The project also includes replacement of valves and mains adjacent to the Hyde Park Pump Station.

The new pipeline is expected to have a useful life of thirty years.

Project Status and Schedule

Pipeline design work for the project began in July, 1983 and is complete. An additional design phase for yard piping will begin in Novmeber, 1987. Construction is due to begin in July, 1988 and last eleven months.

The Engineering Division will be resposible for the project until construction contract award.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design 1	Whitman & Howard	5125	$ 93,035	$ 81,267	$ 11,768
Design 2	To Be Selected		14,500	0	14,500
Constr.	To Be Selected		1,100,000	0	1,100,000
Total			$1,207,535	$ 81,267	$1,126,268

Authority Share

$1,207,535 (100%).

Current Expense Budget Impact

None.

Northern Low Service Section 57 Water Main Rehabilitation

Description and Justification

Section 57 of the Northern Low Service pipeline was built in the early 1900s and is being rehabilitated to restore pipe capacity and pressure. The project consists of two construction phases. Phase one involves relining of 7,630 linear feet of 48 inch pipeline in Everett and Chelsea. The second construction phase involves 8,044 linear feet of pipeline in Medford and Everett. The rehabilitation includes cement mortar lining and installation of impressed current cathodic protection systems to prevent corrosion, including valves, blow-off connections and insulation joints.

The rehabilitated pipeline is expected to have a useful life of fifty years.

Project Status and Schedule

The design work is complete except for construction services which are contained in the design scope of work. The first construction phase was completed in May, 1986. The second construction phase will begin in June, 1987 and finish in May, 1987.

The Construction Division is responsible for the construction phases.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Con.Ser.	O'Brien & Gere	5140	$126,141	$73,105	$53,036
Constr.1	Biotti	5142	816,586	754,189	62,397
Constr.2	To Be Selected		1,000,000	0	1,000,000
Total			$1,942,727	$827,294	$1,115,433

Authority Share

$1,942,727 (100%).

Current Expense Budget Impact

None.

Water Meter Modernization

Description and Justification

The MWRA's water meter system in designed to provide on line, real time information on meter flows and pressures for thirty-five served communities. The meter data is used for determining the consumption level of each community for cost assessment purposes and to improve operations of the distribution system, particularly during emergencies. The system also assists local water conservation efforts by providing complete, accurate and timely information on water flows to the user communities.

This project consists of design and completion of rehabilitation work on 138 revenue meters. Access manholes will be installed and new underground meter chambers will be added to house the measuring equipment and environment equipment. New electrical and telephone hookups will be provided. Telemetry equipment will also be provided to send flow and pressure measurements plus chamber status signals and alarms to the Division's new central monitoring computer.

The meters and equipment are expected to have a useful life of ten years.

Project Status and Schedule

Two construction contracts are now complete. The first was for the purchase and installation of the monitoring computer. The second covered the upgrading of 62 meters and was completed in July, 1984.

The project has two design phases. The first design contract is complete with only release of retainage outstanding. The second design contract will expand on previous design work to incorporate the modifications suggested through experience with the second construction phase. Design work will begin in April, 1987 and be complete in December, 1987.

One construction phase remains for the upgrading of the final 76 revenue meters. Construction is estimated to begin in June, 1988 and be complete in April, 1990. The Waterworks Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design 1	Bethel,Duncan	5182	$520,970	$516,368	$4,602
Design 2	To Be Selected		373,955	0	373,955
Constr.3	To Be Selected		5,000,000	0	5,000,000
Total			$5,894,925	$516,368	$5,378,557

Authority Share

$5,894,925 (100%).

Current Expense Budget Impact

The project is expected to add approximately $40,000 in utility costs to the FY 1991 Current Expense Budget.

Northern High Service - Revere Pipeline Improvement

Description and Justification

The southeast corner of the Northern High Service system has experienced pressure deficiencies due to undersized pipes and extensive pipeline corrosion. Pipeline improvement with increased pressures will primarily benefit Revere, Winthrop and East Boston where low pressure presents fire-fighting problems. Pipeline pressure improvements may also benefit the Deer Island Wastewater Treatment Plant, depending on the determination of water needs in the secondary plant facilities planning process.

The project will consist of laying 3,600 linear feet of 36 and 12,600 linear feet of 30 inch pipelines in Revere, cleaning and lining 7,900 linear feet in Winthrop, and laying 18,000 linear feet of 20 inch pipe to service Winthrop and perhaps Deer Island.

The new pipeline is expected to have a useful life of thirty years.

Project Status and Schedule

The study phase is complete. Design is scheduled to begin in November, 1987 and conclude in October, 1988. Construction is estimated to begin in January, 1989 and be finished in December, 1990.

The Engineering Division will be responsible for this project until the award of a construction contract.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	To Be Selected		$840,000	0	$840,000
Constr.	To Be Selected		10,000,000	0	10,000,000
Total			$10,840,000	0	$10,840,000

Authority Share

$10,840,000 (100%).

Current Expense Budget Impact

None.

Southern Service Improvements

Description and Justification

The Southern High and Southern Extra High Service pipelines depend on the Hyde Park Avenue and Newton St. Pump Stations respectively for pumping capacity. The Hyde Park Avenue Station was built in the 1890s and Newton St. was constructed in the 1950s. Both stations are undersized to meet the current and future pressure needs for Brookline, Milton, Quincy, Norwood, much of Boston, and part of Canton.

This project involves the design and construction of a major rehabilitation of the two pumping stations. The rehabilitation will consist of replacing the existing diesel pumps at Newton St. with three higher capacity electric pumps, upgrading the controls and mechanical systems, and replacing the intake and discharge pipes with ones of higher hydraulic capacity at both stations. Approximately 19,000 feet of 30 and 36 inch pipe will also be installed. The equipment is expected to have a useful life of twenty years.

Project Status and Schedule

The study phase of the project is complete. Design is scheduled to begin in June, 1988 and be complete in one year. Construction is estimated to start in January, 1990.

The Engineering Division is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	To Be Selected		$900,000	0	$900,000
Constr.	To Be Selected		9,500,000	0	9,500,000
Total			$10,400,000	0	$10,400,000

Authority Share.

$10,400,000 (100%)

Current Expense Budget Impact

None.

Heath Hill Road and Route 9 Pipe Replacement

Description and Justification

The section of pipeline near Heath Hill Road supplies water to Brookline, Boston and the Southern Extra High service system. The existing pipeline is corroded and requires replacement.

The project consists of the removal and replacement of existing pipe and valve connections between Sections 19 and 52 and cement mortar lining of approximately 4,000 linear feet of 54 inch steel pipe.

The new pipeline is expected to have a useful life of thirty years.

Project Status and Schedule

The project will have two design and two construction phases. The Department of Public Works will construct a 30 foot portion of pipe while they are undertaking road repair work in April, 1987. Design for this portion of the job will be done by Waterworks Division staff. Design for the remaining pipe rehabilitation is estimated to begin in July, 1988. Constuction will begin in January, 1990.

The Engineering Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	To Be Selected		$100,000	0	$100,000
Constr.1	DPW		100,000	0	100,000
Constr.2	To Be Selected		300,000	0	300,000
Total			$500,000	0	$500,000

Authority Share

$500,000 (100%).

Current Expense Budget Impact

None.

Northern Low Service - Medford Pipe Replacement

Description and Justification

The Medford section of the Northern Low Service is the feed pipeline for Spot Pond in Stoneham. The pipeline was built in the 1920s and suffers from corrosion due to electrolysis and corrosive soils from the tidal flats of the Mystic River. The corrosion levels have led to excessive leaks, resulting in high maintenance costs.

This project consists of removal and replacement of approximately 600 linear feet of 60 inch pipe near Medford Square.

The new pipeline section is expected to have a useful life of thirty years.

Project Status and Schedule

Design work is being done by the Waterworks Division. Construction is scheduled to begin in January, 1989. The Engineering Division will be responsible for this project up to construction award. The Construction Division will oversee the construction phase.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Constr.	To Be Selected		$225,000	0	$225,000

Authority Share

$225,000 (100%).

Current Expense Budget Impact

None.

Fells Distribution Reservoir Study

Description and Justification

The Fells Reservoir is located in the Town of Stoneham and is one of several distribution reservoirs maintained by the Waterworks Division for storage of water supply transported from the main watersheds. The Fells Reservoir provides water to Melrose, Stoneham and Saugus.

The reservoir has experienced high bacteria counts due to unauthorized bathing. The project consists of a study of the alternatives for protection of the reservoir from external pollution. The first alternative being considered is a floating cover for the reservoir. The second alternative is replacement of the reservoir with a standpipe to store water in a closed pipe rather than in an open distribution reservoir.

Project Status and Schedule

The study is scheduled to begin in January, 1989. The Engineering Division will be responsible for the study.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	To Be Selected		$200,000	0	$200,000

Authority Share

$200,000 (100%).

Current Expense Budget Impact

None.

Nonantum Road Pipe Replacement

Description and Justification

The Nonantum Road pipeline is in Brighton and serves Newton and Watertown. The pipeline runs under the trolley tracks and is subject to electrical currents and corrosive soils which have weakened and corroded the steel pipe.

This project consists of removal and replacement of one mile of 60 inch water main. The new section of pipe will be steel-encased reinforced concrete pipeline. The pipeline is expected to have a useful life of thirty years.

Project Status and Schedule

Design work will be done in-house and is scheduled to begin in April, 1987 and conclude in July, 1987. The Waterworks Division will be responsible for the design phase. Construction will begin in January, 1988 and be complete in August, 1988.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Constr.	To Be Selected		$1,200,000	0	$1,200,000

Authority Share

$1,200,000 (100%).

Current Expense Budget Impact

None.

General Edwards Bridge Pipe Relacement

Description and Justification

The General Edwards Bridge in Revere and Lynn is owned by the Metropolitan District Commission and carries a MWRA 20 inch water main. The pipe has had recurring leaks and requires replacement. The bridge is scheduled to be reconstructed by the MDC in October, 1987. An agreement has been reached with the MDC to replace the pipe during the bridge reconstruction. Under the agreement, the MWRA will reimburse the MDC for the new valves, expansion joints, manholes, piping and appurtenances required for the water main.

The new main is expected to have a useful life of fifty years.

Project Status and Schedule

Design and construction will be done by the MDC. Construction is scheduled for October, 1987 and will last three months. The Waterworks Division will oversee the agreement with the MDC.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Constr.	MDC		$80,000	0	$80,000

Authority Share

$80,000 (100%).

Current Expense Budget Impact

None.

Ward Street Pump Station Rehabilitation

Description and Justification

The Ward Street Pump Station is an existing inactive pump station which once provided supply to the area of Newton now served by the Commonwealth Ave. Pump station. Currently, there is no backup capacity for the Commonwealth Ave. station should the pumping units become inoperable or should a break occur in the suction or discharge lines.

The study is scheduled to begin in April, 1988 and last three months. Design is estimated to start in April, 1989 and conclude in September, 1989. Construction will begin in October, 1989 and finish in April, 1990.

Project Status and Schedule

The study is scheduled to begin in April, 1988 and last three months. Design is estimated to start in April, 1989 and conclude in September, 1989. Construction will begin in October, 1989 and finish in April, 1990.

The Engineering Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	To Be Selected		$40,000	0	$40,000
Design	To Be Selected		40,000	0	40,000
Constr.	To Be Selected		200,000	0	200,000
Total			$280,000	0	$280,000

Authority Share

$280,000 (100%).

Current Expense Budget Impact

An estimate of the Current Expense Budget impact will be prepared at the end of the design phase.

OTHER CAPITAL PROJECTS

Rehabilitation of Existing Facilities

Description and Justification

Due to the advanced age of Waterworks Division's facilities, major repairs are needed to restore the existing buildings to proper operational condition. This project begins an on-going program to evaluate the condition of facilities and to schedule each year one or two major rehabilitation efforts until all facilities are restored to optimum condition.

This project consists of rehabilitation work at Glenwood Yard, Hyde Park Pump Station, and Mystic Shop.

Glenwood Yard is a maintenance facility built in the 1840s which currently houses thirty-five staff assigned to the North System maintenance crew. The rehabilitation will have two phases. The first phase is upgrading the electrical service from 110 to 240 volts and rewiring the main building. The second phase will be rehabilitation of the main building, blacksmith shop and sheds. The rehabilitation will consist of replacement of the heating system, structural supports, roof and windows, and installation of a sprinkler system.

The Hyde Park Pump Station houses eight employees and is staffed twenty-four hours per day. The rehabilitation includes new windows, doors, showers and locker room, rest rooms, an electrical power generator and landscaping.

Mystic Shop in Somerville was built in the 1840s. It currently houses twenty-five field personnel. The rehabilitation will consist of new doors, windows, electrical wiring and fixtures, heating system and sprinklers.

The expected useful life of the rehabilitated facilities is fifty years.

Project Status and Schedule

The Glenwood Yard electrical upgrade is scheduled for October, 1987. The rehabilitation design will begin in October, 1988. Construction is estimated to begin in October, 1989 and be complete within a year.

Hyde Park Pump Station rehabilitation design will be done in-house. Construction will begin in July, 1989 and will be complete in one year.

Mystic Shop rehabilitation design will be done in-house. Construction will begin in October, 1989 and be complete in one year.

The Waterworks Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Glwd Elec.	To Be Selected		$125,000	0	$125,000
Glnwd Des.	To Be Selected		30,000	0	30,000
Glnwd Con.	To Be Selected		300,000	0	300,000
Hyde Park	To Be Selected		130,000	0	130,000
Mystic Shop	To Be Selected		375,000	0	375,000
			$960,000	0	$960,000

Authority Share

$960,000 (100%).

Current Expense Budget Impact

None.

Domestic Device Retrofit Pilot Program

Description and Justification

The Domestic Device Retrofit Program is a component of the MWRA's water conservation plan to reduce demand. The program is designed to accelerate installation of water saving devices throughout the service area.

The project consists of a study to determine target communities and households for participation in a pilot program, implementation of the pilot program, and evaluation of the water savings effect of the pilot program. The pilot program may include up to 20,000 households in four communities. The cost and schedule of the pilot may be revised depending on final determination of the scope of services.

Project Status and Schedule

The study phase began in July, 1986 and is scheduled for completion in October, 1986. The pilot program is expected to begin in October, 1987 and finish in December, 1988. The evaluation will begin in December, 1988 and end in December, 1989.

The Waterworks Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	A.D.Little	5060	$24,932	0	$24,932
Pilot	To Be Selected		2,565,068	0	2,565,068
Eval.	To Be Selected		70,000	0	70,000
Total			$2,660,000	0	$2,660,000

Authority Share

2,660,000 (100%).

Current Expense Budget Impact

None.

Central Monitoring System Expansion

Description and Justification

The Waterworks Division is planning to convert to systemwide remote monitoring and control of essentially all Division operations. The existing instrumentation used to measure operating parameters is incomplete, old and in poor condition. The current system also lacks telemetry which would enable the Division to have centralized and immediate information on system performance. Without telemetry, operating decisions are delayed until field personnel are dispatched to collect measurements. This is a cumbersome and undesirable mode of operation, particularly in emergency situations.

The lack of flow measurement within MWRA's delivery system also impedes identification of the sources of unaccounted-for water. The central monitoring system will generate instantaneous data on water flow and pressure in eighteen subsystems beginning with the supply sources and ending at the delivery point to user communities. The data will enable operations staff to detect and pinpoint leaks in the system. The response time for leak repair work can then be lessened, resulting in significant savings of water supply.

The project consists of replacement of existing instrumentation equipment, rehabilitation of automated mechanical equipment, installation of new master meters, acquisition of a telemetry network, purchase of a central monitoring computer system and development of applications software. The project involves replacement and rehabilitation work at 34 existing master meter sites, 22 new master meter sites, 15 western revenue meter sites, 28 reservoir level instrumentation sites, 10 pumping stations, 8 pressure regulator control sites, 4 major throttle valve sites, 6 chemical feed sites, 4 hydroelectric sites, 3 weather stations, 5 sluice gates control sites, and other facilities within the Waterworks system. The equipment is expected to have a useful life of twenty years.

Project Status and Schedule

The study phase of the project will be completed in September, 1986. Design is scheduled to begin in June, 1987 and be complete in September, 1988. Construction is estimated to begin in March, 1989 and end January, 1991.

The Waterworks Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	O'Brien & Gere	5025	$189,601	$176,936	$12,665
Design	To Be Selected		1,150,000	0	1,150,000
Constr.	To Be Selected		11,400,000	0	11,400,000
Total			$12,739,601	$176,936	$12,562,665

Authority Share

$12,739,601 (100%).

Current Expense Budget Impact

The annual impact on the Authority's Current Expense Budget is expected to be as follows:

Wages	$89,000
Utilities	61,000
Materials	21,000
Services	262,000
Total	$433,000

The FY 1991 budget will be the first year of impact, with $217,000 necessary to cover the cost. It is anticipated that increased automation of facilities will also reduce other labor requirements. This reduction will be estimated as design work is completed.

Leak Detection Survey

Description and Justification

There are 6,360 miles of pipeline in the water distribution system. Only 260 miles are owned and operated by the MWRA. The remaining 6,100 miles are owned and operated by thirty-five cities and towns to which the MWRA supplies water. Both the MWRA and local distribution systems lose water due to pipeline leaks. The Authority's Waterworks Division operates a leak detection program funded through its Current Expense Budget. Repair of leaks is performed through the Division's maintenance and Authority's capital programs. Leak detection and repair for local systems has been a responsibility of the individual municipalities.

While some local systems have implemented leak detection and repair programs, the need to conserve water resources requires that all systems undertake such programs. To facilitate the development and implementation of local programs, the Authority is proposing to oversee and finance a once-through leak detection survey of the distribution systems of the user communities. The survey will provide baseline data on the magnitude and location of water leaks. The survey data will be available to both the Authority and the localities. The Authority will use the data to monitor the local repair programs, as mandated by the MWRA enabling act. The local municipalities will use the data to plan and schedule leak repair programs.

Project Status and Schedule

The leak detection survey is scheduled to begin in October, 1987 and be completed in September, 1988.

The Waterworks Division will be responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Survey	To Be Selected		$2,100,000	0	$2,100,000

Authority Share

$2,100,000 (100%).

Current Expense Budget Impact

None.

WATERWORKS CAPITAL PROJECTS CASH FLOW

FISCAL YEARS 1987 - 1989

FY 1987 - 1989
WATERWORKS CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000's)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FISCAL YEARS 87-89	BEYOND FISCAL YEAR 1989
SUPPLY & TREATMENT	39,894	4,697	340	236	303	289	320	220	165	170	229	350	350	300	3,272	31,925
TRANSMISSION	13,977	566	142	31	25	80	965	805	590	980	1,818	950	1,295	1,260	8,941	4,470
DISTRIBUTION & PUMPING	72,041	9,008	1,502	995	683	1,247	1,380	1,758	1,950	2,021	1,747	2,253	4,034	3,398	22,968	40,065
OTHER	18,460	177	38	0	0	50	220	595	1,432	1,665	1,578	425	425	2,010	8,438	9,845
TOTAL RETAINAGE PAYMENTS					58										58	
TOTAL WATERWORKS	$144,372	$14,448	$2,022	$1,262	$1,069	$1,666	$2,885	$3,378	$4,137	$4,836	$5,372	$3,978	$6,104	$6,968	$43,677	$86,305

FY 1987 - 1989
WATERWORKS CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000's)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FYS 87-89	BEYOND FY 1989
I. SUPPLY & TREATMENT																
Long-Range Water Supply																
Study -EIR 2020	5,797	4,217	320	200	200	200	200	100	100	100	160	0	0	0	1,580	0
Local Sources	250	0	0	0	0	75	100	75	0	0	0	0	0	0	250	0
WSCAC I	118	59	20	30	9	0	0	0	0	0	0	0	0	0	59	0
WSCAC II	129	0	0	6	15	14	20	20	15	20	19	0	0	0	129	0
Sub Total	6,294	4,276	340	236	224	289	320	195	115	120	179	0	0	0	2,018	0
Sudbury Reservoir																
EIR Study	500	421	0	0	79	0	0	0	0	0	0	0	0	0	79	0
Design	2,500	0	0	0	0	0	0	0	0	0	0	300	300	250	850	1,650
Construction	28,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28,000
Sludge Mgmt.-Study	200	0	0	0	0	0	0	0	25	25	25	25	25	25	150	50
Sludge Mgmt.-Design	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150
Sludge Mgmt.-Const.	2,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,000
Sub Total	33,350	421	0	0	79	0	0	0	25	25	25	325	325	275	1,079	31,850
Existing Water Sources																
Treatment Study	250	0	0	0	0	0	0	25	25	25	25	25	25	25	175	75
TOTAL:SUPPLY & TREATMENT	$39,894	$4,697	$340	$236	$303	$289	$320	$220	$165	$170	$229	$350	$350	$300	$3,272	$31,925
II. TRANSMISION																
Hultman-Weston Aqueduct Transfer for Hydropower																
Design 1	325	236	6	0	0	0	15	15	15	15	23	0	0	0	89	0
Design 2	60	0	0	0	0	0	0	0	25	15	20	0	0	0	60	0
Construction 1	2,800	0	0	0	0	0	450	550	300	700	800	0	0	0	2,800	0
Construction 2	500	0	0	0	0	0	0	0	0	0	0	0	170	110	280	220
Sub Total	3,685	236	6	0	0	0	465	565	340	730	843	0	170	110	3,229	220
Norumbega Reservoir Chlorination Facility																
Construction	700	0	0	0	0	0	100	125	125	125	150	75	0	0	700	0
Supplemental Pressure Aqueduct																
Study	368	218	15	15	15	15	50	40	0	0	0	0	0	0	150	0
EIR	4,000	0	0	0	0	0	0	0	0	0	500	500	600	700	2,300	1,700
Sub Total	4,368	218	15	15	15	15	50	40	0	0	500	500	600	700	2,450	1,700
Cosgrove Intake Turbine Repair	249	112	121	16	0	0	0	0	0	0	0	0	0	0	137	0

FY 1987 - 1989
WATERWORKS CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000's)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FYS 87-89	BEYOND FY 1989
Oakdale Power Station																
Inspection	10	0	0	0	10	0	0	0	0	0	0	0	0	0	10	0
Generator Repair	360	0	0	0	0	50	250	60	0	0	0	0	0	0	360	0
Substation Design	15	0	0	0	0	15	0	0	0	0	0	0	0	0	15	0
Substation Constr.	75	0	0	0	0	0	75	0	0	0	0	0	0	0	75	0
Transformer Design	15	0	0	0	0	0	0	15	0	0	0	0	0	0	15	0
Transformer Const.	75	0	0	0	0	0	0	0	75	0	0	0	0	0	75	0
Sub-total	550	0	0	0	10	65	325	75	75	0	0	0	0	0	550	0
Echo Bridge Rehab.																
Design	25	0	0	0	0	0	25	0	0	0	0	0	0	0	25	0
Constr.	200	0	0	0	0	0	0	0	0	0	150	50	0	0	200	0
Sub-Total	225	0	0	0	0	0	25	0	0	0	150	50	0	0	225	0
Sluice Gate Rehab.																
Constr.1	550	0	0	0	0	0	0	0	50	125	125	125	125	0	550	0
Constr.2	850	0	0	0	0	0	0	0	0	0	50	200	200	200	650	200
Constr.3	1,200	0	0	0	0	0	0	0	0	0	0	0	200	250	450	750
Constr.4	1,600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,600
Sub-Total	4,200	0	0	0	0	0	0	0	50	125	175	325	525	450	1,650	2,550
TOTAL:TRANSMISSION	$13,977	$566	$142	$31	$25	$80	$965	$805	$590	$980	$1,818	$950	$1,295	$1,260	$8,941	$4,470
III. DISTRIBUTION & PUMPING																
Distr.System Master Plan	250	0	0	0	0	0	0	50	50	50	50	50	0	0	250	0
Spot Pond Pump Station Rehabilitation																
Electrical Upgrade	141	0	47	70	24	0	0	0	0	0	0	0	0	0	141	0
Design	350	0	0	0	0	0	100	100	150	0	0	0	0	0	350	0
Construction	2,200	0	0	0	0	0	0	0	0	400	350	350	400	350	1,850	350
Sub Total	2,691	0	47	70	24	0	100	100	150	400	350	350	400	350	2,341	350
Com. Ave. Pump Station Modernization																
Design	75	0	0	0	0	0	0	0	0	0	0	16	16	18	50	25
Construction	1,200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,200
Sub Total	1,275	0	0	0	0	0	0	0	0	0	0	16	16	18	50	1,225

FY 1987 - 1989
WATERWORKS CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000's)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FYS 87-89	BEYOND FY 1989
Lexington Street Pump Station																
Pump Station																
Design	200	0	0	0	0	0	0	0	15	16	79	90	0	0	200	0
Construction	1,700	0	0	0	0	0	0	0	0	0	0	0	0	450	450	1,250
Sub Total	1,900	0	0	0	0	0	0	0	15	16	79	90	0	450	650	1,250
Northern Intermediate High Service Distribution Improvements																
Design	782	605	177	0	0	0	0	0	0	0	0	0	0	0	177	0
Construction 1	155	140	0	15	0	0	0	0	0	0	0	0	0	0	15	0
Construction 2	4,087	3,946	141	0	0	0	0	0	0	0	0	0	0	0	141	0
Construction 3	5,238	0	0	200	500	750	750	500	750	750	500	250	288	0	5,238	0
Construction 4	1,000	0	0	0	0	0	0	400	250	350	0	0	0	0	1,000	0
Sub Total	11,262	4,691	318	215	500	750	750	900	1,000	1,100	500	250	288	0	6,571	0
Northern High Service Pipe Improvements-Lynn Pipeline																
Design 2	373	266	2	20	85	0	0	0	0	0	0	0	0	0	107	0
Design 3	30	0	0	30	0	0	0	0	0	0	0	0	0	0	30	0
Design 4	300	0	0	0	0	0	0	0	0	0	0	0	100	60	160	140
Construction 2	4,162	2,592	1,000	570	0	0	0	0	0	0	0	0	0	0	1,570	0
Construction 3	6,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,000
Sub Total	10,865	2,858	1,002	620	85	0	0	0	0	0	0	0	100	60	1,867	6,140
Boston Low Service Pipe Rehabilitation																
Pipe Study	328	35	52	63	64	64	50	0	0	0	0	0	0	0	293	0
Test Pits	100	0	0	0	0	0	0	100	0	0	0	0	0	0	100	0
Design	600	0	0	0	0	0	0	0	0	0	0	120	120	120	360	240
Construction 1	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10,000
Sub Total	11,028	35	52	63	64	64	50	100	0	0	0	120	120	120	753	10,240
Hyde Park Pipe Replacement																
Design 1	93	81	0	12	0	0	0	0	0	0	0	0	0	0	12	0
Design 2	14	0	0	0	0	0	0	4	5	5	0	0	0	0	14	0
Construction	1,100	0	0	0	0	0	0	0	0	0	0	350	250	200	800	300
Sub Total	1,207	81	0	12	0	0	0	4	5	5	0	350	250	200	826	300

FY 1987 - 1989
WATERWORKS CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000's)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FYS 87-89	BEYOND FY 1989
Northern Low Service Section 57																
Water Main Rehabilitation																
Design	126	73	15	15	10	13	0	0	0	0	0	0	0	0	53	0
Construction 1	817	754	63	0	0	0	0	0	0	0	0	0	0	0	63	0
Construction 2	1,000	0	0	0	0	300	300	350	50	0	0	0	0	0	1,000	0
Sub Total	1,943	827	78	15	10	313	300	350	50	0	0	0	0	0	1,116	0
Water Meter Modernization																
Design 1	521	516	5	0	0	0	0	0	0	0	0	0	0	0	5	0
Design 2	374	0	0	0	0	120	120	134	0	0	0	0	0	0	374	0
Construction	5,000	0	0	0	0	0	0	0	0	0	50	675	675	675	2,075	2,925
Sub Total	5,895	516	5	0	0	120	120	134	0	0	50	675	675	675	2,454	2,925
NHS - Revere Pipeline Improvement																
Design	840	0	0	0	0	0	0	0	180	150	150	160	200	0	840	0
Construction	10,000	0	0	0	0	0	0	0	0	0	0	0	1,500	1,250	2,750	7,250
Sub Total	10,840	0	0	0	0	0	0	0	180	150	150	160	1,700	1,250	3,590	7,250
Southern Service Improvements																
Design	900	0	0	0	0	0	0	0	0	0	98	122	200	200	620	280
Construction	9,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9,500
Sub Total	10,400	0	0	0	0	0	0	0	0	0	98	122	200	200	620	9,780
Heath Hill Road and Route 9 Pipe Replacement																
Design 2	100	0	0	0	0	0	0	0	0	0	50	50	0	0	100	0
Construction	100	0	0	0	0	0	60	40	0	0	0	0	0	0	100	0
Construction	300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	300
Sub Total	500	0	0	0	0	0	60	40	0	0	50	50	0	0	200	300
Northern Low Service Medford Pipe Replacement																
Construction	225	0	0	0	0	0	0	0	0	0	0	0	225	0	225	0

FY 1987 - 1989
WATERWORKS CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000's)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FYS 87-89	BEYOND FY 1989
Fells Distribution																
Reservoir Study																
Study	200	0	0	0	0	0	0	0	0	0	0	0	60	60	120	80
Nonantum Road Pipe																
Replacement	1,200	0	0	0	0	0	0	0	500	300	400	0	0	0	1,200	0
General Edwards Bridge Pipe	80	0	0	0	0	0	0	80	0	0	0	0	0	0	80	0
Ward Street Pump Station																
Rehab.																
Study	40	0	0	0	0	0	0	0	0	0	20	20	0	0	40	0
Design	40	0	0	0	0	0	0	0	0	0	0	0	0	15	15	25
Construction	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200
Sub Total	280	0	0	0	0	0	0	0	0	0	20	20	0	15	55	225
TOTAL DIST. & PUMPING	$72,041	$9,008	$1,502	$995	$683	$1,247	$1,380	$1,758	$1,950	$2,021	$1,747	$2,253	$4,034	$3,398	$22,968	$40,065
IV. OTHER CAPITAL PROJECTS																
Rehab of Existing Facilities																
Glenwood Yard Elec.	125	0	0	0	0	0	0	125	0	0	0	0	0	0	125	0
Glenwood Yard Design	30	0	0	0	0	0	0	0	0	0	0	15	15	0	30	0
Glenwood Yd. Constr.	300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	300
Hyde Park Pump Station	130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	130
Mystic Shop	375	0	0	0	0	0	0	0	0	0	0	0	0	0	0	375
Sub Total	960	0	0	0	0	0	0	125	0	0	0	15	15	0	155	805
Dom. Device Retrofit Pilot Program																
Study	25	0	25	0	0	0	0	0	0	0	0	0	0	0	25	0
Pilot	2,565	0	0	0	0	0	0	50	712	945	858	0	0	0	2,565	0
Evaluation	70	0	0	0	0	0	0	0	0	0	0	10	10	10	30	40
Sub Total	2,660	0	25	0	0	0	0	50	712	945	858	10	10	10	2,620	40

FY 1987 - 1989
WATERWORKS CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000's)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FYS 87-89	BEYOND FY 1989
Central Monitoring System Expansion																
Study	190	177	13	0	0	0	0	0	0	0	0	0	0	0	13	0
Design	1,150	0	0	0	0	50	220	220	220	220	220	0	0	0	1,150	0
Construction	11,400	0	0	0	0	0	0	0	0	0	0	0	400	2,000	2,400	9,000
Sub Total	12,740	177	13	0	0	50	220	220	220	220	220	0	400	2,000	3,563	9,000
Leak Detection Survey	2,100	0	0	0	0	0	0	200	500	500	500	400	0	0	2,100	0
TOTAL OTHER	$18,460	$177	$38	$0	$0	$50	$220	$595	$1,432	$1,665	$1,578	$425	$425	$2,010	$8,438	$9,845
I. FINAL PAYMENTS & RELEASE OF RETAINAGE																
Norumbega Reservoir X					6										6	
Norumbega Reservoir Design					5										5	
Northern High Service Improvements - Lynn					26										26	
Chestnut Hill Pump Station					4										4	
Northern Low Service Study					9										9	
Northern Low Service Design					8										8	
TOTAL:FINAL PAYMENTS					$58										$58	
GRAND TOTAL WATERWORKS	$144,372	$14,448	$2,022	$1,262	$1,069	$1,666	$2,885	$3,378	$4,137	$4,836	$5,372	$3,978	$6,104	$6,968	$43,677	$86,305

ADMINISTRATION

ADMINISTRATION FACILITIES PROGRAM AND CAPITAL EXPENDITURE BUDGET FY 1987 - 1989

Introduction

The Administration Facilities Program consists of centralized facilites, equipment and services. Centralized facilities include Authority headquarters and a regional vehicle maintenance facility. Centralized equipment provides for completion of the one-time purchasing program for all Divisions. Centralized services include ancillary technical and consulting services required to implement the Wastewater and Waterworks Facilities Programs. A Capital Budget Contingency for the entire Authority is also included.

Capital Budget Summary

The Administration Facilties Program and Capital Expenditure Budget for FY 1987 to FY 1989 includes proposed outlays of $24.3 million. The projected cost of the Capital Budget Contingency is $27.9 million for the three-year period.

The Administration Facilities Program includes proposed outlays in three program categories: equipment, buildings and other capital projects. Table 9 presents the anticipated fiscal year expenditures in each of the three program categories. The contingency distribution by fiscal year is also shown.

Expenditures beyond FY 1989 will be required to complete two projects, Harbor Research and Monitoring and the Management Information System. It is anticipated that $800,000 will be necesary for completion of these projects. The contingency will also continue beyond FY 1989.

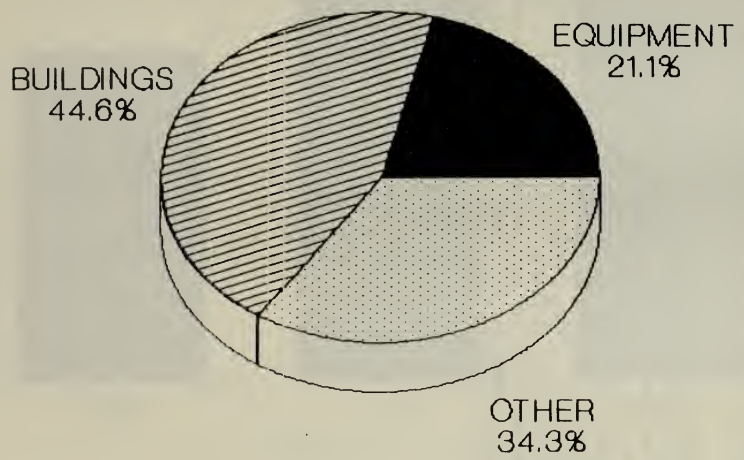
Descriptions of the individual equipment, building and other capital projects follow this summary. A detailed expenditure cash flow for the Administration Facilities Program and Authority Contingency follows the project descriptions.

Table 9

ADMINISTRATION FACILITIES PROGRAM
AND
CAPITAL EXPENDITURE BUDGET
FY 1987 - 1989
(000s)

Program Category	FY87	FY88	FY89	FY87-89 TOTAL	BEYOND FY89
Equipment	$4,219	$893	0	$5,112	0
Buildings	2,475	8,350	$ 0	10,825	$ 0
Other Admin.Project	2,099	2,966	3,253	8,318	800
Total	$ 8,793	$12,209	$3,253	$24,255	$ 800
Capital Budget Contingency	$3,000	$8,700	$16,200	$27,900	$19,700

ADMINISTRATION FACILITIES PROGRAM
FY87-89 CAPITAL EXPENDITURE BUDGET

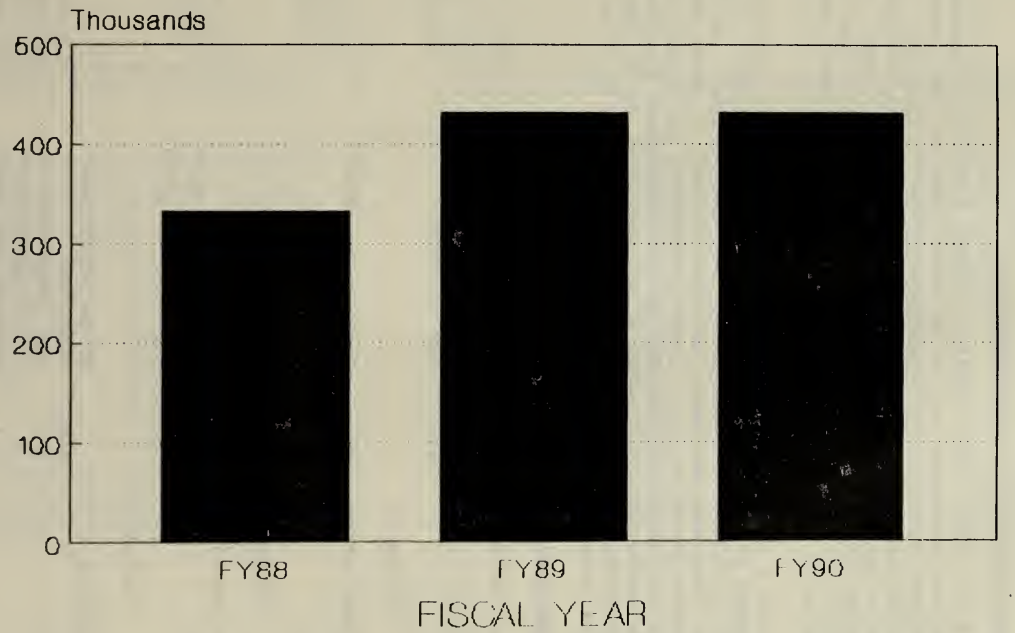


Current Expense Budget Impact

The Administration Capital Budget will impact the Support Division's Current Expense Budget. Two projects are expected to result in increased operating costs: the Authority Radio Communications System and the Vehicle Maintenance Garage. The accompanying chart shows the projected impact on the Current Expense Budget Impact for FY 1987 - FY 1989. The increased costs amount to $333,000 in FY 1988. The impact of Administration capital projects is anticipated to be an additional $99,000 for FY 1989.

During FY 1987 and FY 1988, the Authority will complete the vehicle and equipment purchases that are necessary to correct deficiencies in the vehicle fleet and capital equipment inherited from the Metropolitan District Commission. In 1989, the Authority plans to begin a vehicle and equipment replacement program to maintain its capital stock in good operating condition. The replacement program will be budgeted in the Authority's Current Expense Budget. The annual cost of this program will be projected when replacement policies are established by the MWRA Board of Directors.

SUPPORT DIVISION
CUMULATIVE CURRENT EXPENSE BUDGET IMPACT



ADMINISTRATION - EQUIPMENT

Centralized Equipment and Vehicle Purchase

Description and Justification

The FY 1986 - 1988 Capital Budget authorized equipment and vehicle purchases up to $4.55 million for the Sewerage, Waterworks and Central Administration Divisions. In FY 1986, the purchasing process for authorized equipment purchases did not begin until the last quarter of the fiscal year. Most of the equipment and vehicles did not arrive until after the start of FY 1987. Therefore, the FY 1986 capital equipment expenditure level was only $100,000 of the $4.55 million.

For the FY 1987 - 1989 budget, the Authority again plans to expend $4.5 million for equipment and vehicles. The purchases are expected to occur in FY 1987 and FY 1988. An itemization of the proposed purchases is shown below. In both the Sewerage and Waterworks Divisions, lump sum amounts are shown which reflect the current liability for FY 1986 equipment purchase awards where the goods were delivered after the start of FY 1987. Since these expenditures will be made in FY 1987, they must be included in this budget.

Itemization and Cost Estimate

Division	Quantity	Item	Unit Cost	Total
Admin.&Fin.	(1)	Mini Bus	$45,000	$45,000
	(1)	Van (8 Pass.)	15,000	15,000
Subtotal				$60,000
Construction	(4)	Pick Up Trucks	$11,000	$44,000
	(6)	Vans	11,000	66,000
	(2)	4 Wh.Drive	14,000	28,000
Subtotal				$138,000
Engineering	(1)	4 Door Sedan	$13,000	$13,000
	(1)	4 Wh.Dr.Crew Cab	18,000	18,000
	(1)	Blue Line Printer	10,000	10,000
Subtotal				$41,000
Sewerage		FY 86 Purchases		$1,162,178
	(20)	Samplers	$2,000	40,000
	(1)	Gas Compressor	35,000	35,000
	(6)	Air Compressor	15,333	92,000
	(1)	Auto.Repair Equip.	70,000	70,000
	(1)	Tractor	23,600	23,600
	(3)	Mobile Cranes	15,333	46,000
	(1)	Hydro Crane	127,000	127,000

	(1)	Truck Chassis(Hydro)	40,000	40,000
	(2)	Flat Bed Trailers	15,000	30,000
	(1)	Catch Basin Cleaner	65,000	65,000
	(1)	Workboat	40,000	40,000
	(1)	Mobile Repair Shop	65,000	65,000
	(1)	Tow Truck	95,000	95,000
	(1)	Bull Dozer	86,000	86,000
	(2)	Bucket Machine	11,000	22,000
	(1)	Welding Equipment	17,800	17,800
	(1)	Condensate Pump	22,000	22,000
	(1)	Diesel Power Unit	16,000	16,000
	(1)	Portable Diesel Pump	10,000	10,000
	(1)	Spectrophotometer	30,000	30,000
	(1)	Electic Pump	4,000	4,000
	(1)	Hydralic Press	10,200	10,200
	(1)	4 Door Sedan	12,000	12,000
	(2)	Mini-Vans	12,500	25,000
	(1)	Passenger Van	16,000	16,000
	(3)	Rack Body Truck	40,000	120,000
	(2)	Container Truck	45,000	90,000
	(1)	Aerial Bucket Truck	50,000	50,000
	(1)	Vehicle Tow Truck	95,000	95,000
	(4)	Sampling Vans	45,000	180,000
	(2)	Engine Analyzer	29,000	58,000
	(1)	Rack Truck	21,000	21,000
	(1)	Lab Equipment	48,940	48,940
	(1)	Stockroom Cabinets	10,000	10,000
	(1)	Snow Blower	3,000	3,000
	(3)	Pick Up Trucks	20,000	60,000
	(1)	Comm.Conrol Panel	10,000	10,000
Subtotal				$2,947,718
Support	(1)	Sedan	$12,500	$ 12,500
Waterworks		FY 86 Purchases		$562,005
	(5)	4 Wh.Dr.Tractor&Mower	$10,000	50,000
	(1)	Backhoe/Loader	50,000	50,000
	(1)	Backhoe/Trailer	6,000	6,000
	(2)	4x4 Dump Truck/Plow	24,000	48,000
	(7)	4 Wh.Dr.Pick Up Truck	15,000	105,000
	(3)	All Terrain Vehicle	3,000	9,000
	(1)	4 Wh.Dr.Pick Up/Tow Bar	18,000	18,000
	(3)	4 Wh.Dr.Pick Up/Plow	17,000	51,000
	(5)	Trailers	2,000	10,000
	(2)	Rally Vans	15,000	30,000
	(7)	4 Wh.Dr.Pick Up(6 Pass.)	18,000	126,000
	(9)	Window Vans	12,000	108,000
	(3)	Stake Body Truck	20,000	60,000
	(3)	Crew Cab Util. Body	21,000	63,000
	(2)	Compressor	8,000	16,000
Subtotal				$1,312,005

Grand Total	$4,511,223

Authority Radio Communications System

Description and Justification

The Authority currently does not have a radio communications system. The Construction, Waterworks and Sewerage Divisions need a radio system to maintain communication between geographically dispersed facilities and mobile work crews.

This projects consists of selection and installation of an 800 MHz trunk conventional radio system. The proposed system would have three radio communications channels, one for each division. A sub-fleet communications network will also be provided. In addition, a limited number of cellular phones will be installed in the vehicles of certain key staff.

The Authority radio communications system is expected to have a useful life of ten years.

Project Status and Schedule

The equipment contract award is scheduled for February, 1987. Delivery and installation is expected in July, 1987.

The Support Division is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Equip.	To Be Selected		$600,000	0	$600,000

Authority Share

$600,000 (100%).

Current Expense Budget Impact

The annual impact on the Support Divisions Current Expense Budget is expected to be as follows:

Materials	13,000
Services	24,000
Total	$37,000

The system is scheduled to become operational in July, 1987, resulting in a cost increase of $37,000 the FY 1988 Current Expense Budget.

ADMINISTRATION - BUILDINGS

MWRA Future Headquarters

Description and Justification

The Authority will require a permanent headquarters which should include administrative offices, central metering facilities for the waterworks and wastewater systems, electronics, electrical and mechanical shops, a vehicle maintenance facility, a warehouse, archive, a regional laboratory and garage. Ideally, these facilities would be located at one site.

This project consists of the planning, design and construction of the future headquarters. Specific proposals for land, building and equipment requirements will be developed in the facilities planning stage.

The headquarters facilities are expected to have a fifty year useful life.

Project Status and Schedule

The planning study is scheduled to begin in January, 1987 and will conclude in October, 1987. The land acquisition process is on-going and must be completed before design can begin. The design phase and construction phases are contingent upon the study findings and site availability.

The Office of the Executive Director is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	To Be Selected		$300,000	0	$300,000
Land			8,000,000	0	8,000,000
Total			$ 8,300,000,	0	$ 8,300,000

Authority Share

$ 8,300,000 (100%).

Current Expense Budget Impact

The Current Expense Budget impact will be estimated in the design phase of the project.

Charlestown Headquarters

Description and Justification

The Authority's temporary headquarters are located at the Charlestown Navy Yard. The Charlestown headquarters consist of two buildings. Each building requires leasehold improvements, furnishings and a telephone system.

This project includes space renovations, furniture and equipment purchases and installation of the telephone system.

Furniture, equipment and phones are expected to have a useful life of fifteen years. The space renovations will have a minimum useful life of four years, depending on whether the Authority is able to relocate to permanent headquarters by 1990.

Project Status and Schedule

Leasehold improvements to Building #36 began in October, 1985 and will be completed in December, 1986. Improvements to Building #34 began in September, 1986 and are scheduled for completion in January, 1987.

Telephone installation in Building #36 began in October, 1985 and concluded in September, 1986. Installation of the phones in Building #34 began in September, 1986 and is scheduled for completion in January, 1987.

Most of the furnishings for Building #36 have been delivered. Final deliveries are anticipated by October, 1986. Furnishings for Building #34 are anticipated to arrive by January, 1987.

The Administration and Finance Division is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Bld.#36	Improvements		$424,000	0	$424,000
Bld.#34	Improvements		517,000	0	517,000
Bld.#36	Telephone		63,000	0	63,000
Bld.#34	Telephone		70,000	0	70,000
Bld.#36	Furniture		765,000	$89,070	675,930
Bld.#34	Furniture		525,000	0	525,000
Total			$2,364,000	$89,070	$2,274,930

Authority Share

$2,364,000 (100%).

Current Expense Budget Impact

Additional costs associated with a full year of operation of the Charlestown Headquarters will be estimated during the FY 1988 Current Expense Budget development Process.

Vehicle Maintenance Garage

Description and Justification

The Authority presently does not have a central vehicle maintenance garage. Vehicle maintenance is scattered throughout the MWRA facilities. This project proposes design, rehabilitation and purchase of equipment for a central facility for vehicle maintenance. It is anticipated that the Authority will lease an existing building in Charlestown which is suitable for rehabilitation as a vehicle maintenance facility.

This facility will have a useful life of five years at minimum, depending on the development of vehicle maintenance facilities at the future MWRA Headquarters.

Project Status and Schedule

The search for suitable rental property began in September, 1986. When a lease agreement is negotiated, design can begin. It is anticipated that the earliest possible start date for design is February, 1987. The design phase will take three months. If a site is located in the next month, construction could begin in May, 1987 and be completed by September, 1987.

The Support Division is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Design	To Be Selected		$50,000	0	$50,000
Constr.	To Be Selected		200,000	0	200,000
Total			$250,000	0	$250,000

Authority Share

$250,000 (100%).

Current Expense Budget Impact

The annual impact of the addition of a central vehicle maintenance facility is projected to be as follows:

Rent	$150,000
Wages	175,000
Services	20,000
Materials	50,000
Total	$395,000

This projection is net of savings realized at other MWRA facilities from the transfer of maintenance responsibilities. The projection includes the maintenance costs of additional Authority vehicles scheduled to be purchased in FY 1987.

Since the garage will become operational in September, 1987, the Support Division FY88 Current Expense Budget will increase by $296,000. The remaining $99,000 will impact the FY89 budget.

OTHER ADMINISTRATION CAPITAL PROJECTS

MWRA Mitigation Program

Description and Justification

The Winthrop Mitigation Program currently provides funds and assistance designed to mitigate the impacts of the construction and operation of the Deer Island "Fast Track" improvements on the citizens of the Town of Winthrop. The Authority will provide police escort services and noise metering through the contractor responsible for the Deer Island Pump and Power project. In addition, the Authority will provide funds for street and utility repair and four traffic signals in the Town and will reimburse Winthrop for administrative and consulting fees associated with the review and investigation of issues involved in the "Fast Track" improvements.

Additional mitigation steps for other impacted communities may be necessary as construction and operational programs are implemented.

Project Status and Schedule

The Winthrop Mitigation Program is detailed in Memoranda of Understanding (MOU) between the Authority and the Town of Winthrop. The MOU was signed in February, 1986 and will continue in effect until October, 1988. Prior to expiration of the MOU, it is expected that a new Memorandum of Understanding regarding non-environmental mitigation measures will be finalized and adopted by the MWRA Board of Directors. The new agreement will address the long-term effect of the Authority's capital construction program and treatment plant operation on the Town.

The Office of the Executive Director is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Consult.	Winthrop	5875	$123,000	$8,000	$115,000
Traffic Sig.	Winthrop	5875	350,000	0	350,000
Str.&Util.	Winthrop	5875	400,000	0	400,000
Total			$873,000	$8,000	$865,000

Authority Share

$873,000 (100%).

Current Expense Budget Impact

None.

Technical Assistance Contracts

Description and Justification

Efficient implementation of the Authority's Capital Facilities Program often requires specialized skills and technical assistance that is unavailable from in-house staff. This project is designed to ensure ready access to a variety of skills and assistance when they are needed. The project consists of a series of task order contracts with pre-set upset limits. The task order can be issued by a Division Director when immediate expertise on capital projects is required.

The technical assistance contracts will include the following engineering and other skills: sanitary, electrical, HVAC, mechanical, structural, materials testing, environmental testing, geotechnical services, surveying, claims management and construction contract review.

Project Status and Schedule

The technical assistance contracts are expected to be awarded by January, 1987. The contracts will remain in effect for FY 1987 - FY 1989.

The Engineering Division will be responsible for overseeing the sanitary, electrical, HVAC, mechanical, structural, environmental testing, geotechnical and surveying contracts.

The Construction Division will be responsible for the materials testing and claims management contracts.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Sanitary	To Be Selected		$250,000	0	$250,000
Electrical	To Be Selected		370,000	0	370,000
HVAC	To Be Selected		370,000	0	370,000
Mechanical	To Be Selected		250,000	0	250,000
Structural	To Be Selected		250,000	0	250,000
Mat.Testing	To Be Selected		250,000	0	250,000
Env.Testing	To Be Selected		250,000	0	250,000
Geotech.	To Be Selected		250,000	0	250,000
Surveying	To Be Selected		250,000	0	250,000
Claims Mgt.	To Be Selected		250,000	0	250,000
Contract Review	To Be Selected		100,000	0	100,000
Total			$2,840,000	0	$2,840,000

Authority Share

$2,840,000 (100%).

Current Expense Budget Impact

None.

Construction Management Study

Description and Justification

The Authority's Construction Division is responsible for oversight of all major contruction projects. This function is key to ensuring that capital construction results in acquisition of facilities that are structurally sound and operationally efficient.

In its oversight function, the Division's record keeping and processing are central to successful and timely completion of capital projects. Divisional personnel are responsible for job progress reports, contract schedule monitoring, materials inspection and testing, contract change orders and a host of construction-related fiscal and legal documents. Consequently, the Division's records are critical to the Authority's ability to resolve disputes with contractors and to successfully undergo performance and financial audits from outside agencies. It is in the Authority's best interest to ensure that professional construction management practices and procedures are adhered to in the Construction Division.

This project consists of consultant services to develop a comprehensive set of standard procedures and compatible processing systems for construction documents throughout the Authority.

Project Status and Schedule

Interim procedures are now being implemented. Development of permanent procedures is scheduled to begin in October, 1987 and be completed in July, 1988.

The Construction Division is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	To Be Selected		$150,000	0	$150,000

Authority Share

$150,000 (100%).

Current Expense Budget Impact

The impact on the Division's Current Expense Budget, if any, will be estimated when procedures and systems are developed.

Engineering Feasibility Study

Description and Justification

When the Authority enters the bond market to finance its Capital Facilities Program, it becomes subject to a number of reporting requirements. One such requirement is that the Authority undertake an independent assessment of the structural integrity of the water and wastewater systems and the financial feasibility of future rate charges. The study is intended to assure bondholders that the systems will continue in service and that future rate charges can be collected. The study is needed in order to have future access to the revenue bond market.

Project Status and Schedule

The study is scheduled to begin in April, 1987 and be completed in April, 1988.

The Administration and Finance Division is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	To Be Selected		$250,000	0	$250,000

Authority Share

$250,000 (100%).

Current Expense Budget Impact

None.

Harbor Research and Monitoring Program

Description and Justification

Over the course of the next fifteen years, the Authority will expend billions of dollars in planning, design and construction of wastewater treatment facilities. The policy goal underlying this public investment is substantial improvement in the ecology of Boston Harbor.

The environmental benefits to be derived from the Authority's clean-up efforts can only be estimated at this time. The current state of scientific knowledge concerning the environmental condition and ecological balance in Boston Harbor is woefully inadequate. There is a need to establish baseline data on current conditions.

The Authority plans to participate in a joint public and private effort to establish a harbor monitoring and research program. The program will conduct research projects that will report on existing conditions and measure incremental change as the residuals management program and treatment plant upgrading are implemented.

The monitoring and research program will have several benefits for the MWRA. It will provide empirical data on the effect of treated wastewater discharges on the harbor environment which will be helpful in future decision-making regarding additional treatment facilities. In addition, the data will be helpful in demonstrating to rate payers that their investment results in a healthier environment as well as higher quality service delivery.

Project Status and Schedule

The research program is intended to be a joint effort between state government, the Authority and public and private research centers. The structure and scope of the research program is now under discussion with the MWRA Board of Directors and state environmental officials. It is anticipated that the program will begin during FY 1987.

The Office of the Executive Director is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	To Be Selected		$500,000	0	$500,000

Authority Share

The Authority proposes to contribute $200,000 per year to establish the monitoring and research program. It is expected that additional contributions will be forthcoming from state government and environmental agencies. The total program cost and the distribution between the Authority and other agencies will be determined in FY 1987.

Current Expense Budget Impact

None.

Management Systems Development

Description and Justification

The Authority's Administration and Finance Division provides administrative, financial and support services to all other divisions. The Division's organization plan was adopted by the Board of Directors in April, 1986. The Division is now in the process of staffing the Treasury, Budget, Personnel, Procurement, Administrative Services and Management Information Services Departments.

The Division is now reviewing the interim management policies, procedures and systems currently in place in each department. The review has resulted in identification of specific systems which require development or enhancement. These management systems include purchasing, inventory control, payroll, job classification, wage and salary administration, labor relations, accounting, investment planning and revenue administration. To assist in the development and enhancement of these systems, expert advice is needed.

This project consists of consultant contracts for management systems development. The first phase is a job classification and compensation study. The second phase is a materials management and inventory control systems design study. The third phase consists of consultant services to recommend financial and administrative systems enhancement for personnel, purchasing and payroll. These contracts are expected to be a one-time cost of establishing the Authority.

Project Status and Schedule

The job classification and compensation study began in September, 1985 and will be completed in October, 1986. The materials management phase will begin in April, 1987 and be completed in March, 1988. The systems enhancement phase is scheduled to begin in February, 1987 and finish in April, 1988.

The Administration and Finance Division is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Comp.Stu.	Peat,Marwick	5908	$184,000	$61,152	$122,848
Mat.Mgt.	To Be Selected		75,000	0	75,000
Study	To Be Selected		150,000	0	150,000
Total			$409,000	$61,152	347,848

Authority Share

$409,000 (100%).

Current Expense Budget Impact

The impact of this project on the Current Expense Budget will be estimated when systems design is complete and implementation costs are identifiable.

Capital Program Consultants

Description and Justification

Implementation of the Capital Facilities Program sometimes requires that the Executive Director have the ability to hire consultants and other experts for temporary assignments. Such assignments are an ancillary cost associated with planning, design and construction of facilities. The assignments to date have focused on emergency situations created by construction problems and evaluation of planning reports and design work produced by outside firms.

The Executive Director has the authority to execute consultant contracts up to a maximum of $15,000. This project provides funding for up to seven consultants per year in skill areas which are not included in the technical assistance contracts previously described.

Project Status and Schedule

The consultant assignments will begin this fall and continue throughout FY 1987 - FY 1989.

The Office of the Executive Director is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Consult.	To Be Selected		$315,000	0	$315,000

Authority Share

$315,000 (100%).

Current Expense Budget Impact

None.

Management Information Systems

Description and Justification

The Authority presently does not have a management information system (MIS). A MIS system is critical to efficient professional management of Authority affairs. The MIS system is envisioned to automate the engineering, construction, operations, administrative and financial management systems of the Authority.

The project includes a data processing needs assessment, purchase and installation of computer hardware and accessories, expansion of the existing word processing system, and development of appropriate software to meet information systems needs.

Hardware and software are expected to have a minimum useful life of ten years.

Project Status and Schedule

The needs assessment began in October, 1986 and is expected to be completed in July, 1987. Acquisition of word processing equipment began in September, 1986 and will be completed in March, 1987. Computer hardware acquisition is scheduled to begin in March, 1988 and be complete by January, 1989. Software development will begin in March, 1988 and finish in January, 1990.

The Administration and Finance Division is responsible for this project.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
Study	Coopers&Weston	5906	$250,000	0	$250,000
Hardware	To Be Selected		800,000	0	800,000
Software	To Be Selected		2,500,000	0	2,500,000
Word Pro.	To Be Selected		250,000	0	250,000
Total			$3,800,000	0	$3,800,000

Authority Share

$3,800,000 (100%).

Current Expense Budget Impact

Development of a management information system will impact the Authority's Current Expense Budget. An estimate of the impact will be prepared after the needs assessment and system recommendations are complete.

CAPITAL BUDGET CONTINGENCY

Capital Budget Contingency

Description and Justification

There are certain costs associated with the Capital Facilities Program that are not possible to predict with any degree of certainty. These costs include legal fees, settlement of claims, acquisition of land and a variety of study, design and construction change orders and contract amendments.

A capital budget contingency is needed to authorize the expenditure of funds to cover these costs. The amount necessary for the contingency was estimated using the following rules of thumb.

1) For all on-going project phases, five percent of the contract award amounts was estimated.

2) For study and design phases where the contract award has not occured and for construction contracts not yet awarded, but with completed design phases, ten percent of the total phase costs was estimated.

3) For construction contracts for which design has not been completed, twenty percent of the construction total was estimated.

4) These estimates were combined by fiscal year to derive the total contingency needed per year. The estimates were then reduced by forty percent, assuming that not all projects will require contingency transfers.

The total contingency required for the three year program period is $47.6 million using this method of estimation. It is expected that the actual cash outlays will be significantly less during FY 1987 - FY 1989. Assuming that the average payout period of every transfer is three years, the actual estimated cash outlay for the next three years is $27.9 million.

Project Status and Schedule

The Executive Director will be authorized to transfer funds from the contingency to capital projects. The Administration and Finance Division will responsible for the administration of the contingency.

Project Phase Description and Cost Estimate

Project Phase	Project Participants	Contract Number	Total Cost	Prior Payments	Remaining Balance
FY 87			$11,500,000	0	$11,500,000
FY 88			13,800,000	0	13,800,000
FY 89			22,300,000	0	22,300,000
Total			$47,600,000	0	$47,600,000

Authority Share

The Authority share is unknown at this time. If contingency transfers are made to projects that are grant eligible, the additional cost may be reimbursed by the granting agency.

Current Expense Budget Impact

None.

ADMINISTRATION CAPITAL PROJECTS CASH FLOW

FISCAL YEARS 1987 - 1989

FY 1987 - 1989
ADMINISTRATION CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000'S)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FYS 87-89	BEYOND FY 1989
TOTAL EQUIPMENT	$5,112	$0	$1,400	$620	$901	$1,298	$400	$157	$200	$136	$0	$0	$0	$0	$5,112	$0
		-									-	-	-	-		-
TOTAL BUILDING	$10,914	$89	$400	$502	$888	$685	$8,150	$150	$50	$0	$0	$0	$0	$0	$10,825	$0
													-			
TOTAL OTHER	$9,187	$69	$110	$562	$686	$741	$601	$585	$690	$1,090	$945	$815	$639	$854	$8,318	$800
		--														
TOTAL ADMINISTRATION	$25,213	$158	$1,910	$1,684	$2,475	$2,724	$9,151	$892	$940	$1,226	$945	$815	$639	$854	$24,255	$800
TOTAL CONTINGENCY	$47,600	$0	$0	$1,000	$1,000	$1,000	$2,150	$2,150	$2,150	$2,250	$4,050	$4,050	$4,050	$4,050	$27,900	$19,700

FY 1987 - 1989
ADMINISTRATION CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000'S)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FYS 87-89	BEYOND FY 1989
I. EQUIPMENT																
Centralized Equipment Purchase																
Admin. & Finance	60	0	0	0	60	0	0	0	0	0	0	0	0	0	60	0
Constr. Division	138	0	0	58	0	0	0	44	0	36	0	0	0	0	138	0
Engineering	41	0	0	0	41	0	0	0	0	0	0	0	0	0	41	0
Sewerage	2,948	0	1,000	500	700	748									2,948	0
Waterworks	1,312	0	400	62	100	150	200	100	200	100	0	0	0	0	1,312	0
Support	13	0	0	0	0	0	0	13	0	0	0	0	0	0	13	0
Sub Total	4,512	0	1,400	620	901	898	200	157	200	136	0	0	0	0	4,512	0
Authority Radio Comm	600	0	0	0	0	400	200	0	0	0	0	0	0	0	600	0
TOTAL EQUIPMENT	$5,112	$0	$1,400	$620	$901	$1,298	$400	$157	$200	$136	$0	$0	$0	$0	$5,112	$0
II. BUILDING																
MWRA Future Hdqtrs																
Study	300	0	0	0	0	100	100	100	0	0	0	0	0	0	300	0
Land Aquisition	8,000	0	0	0	0	0	8,000	0	0	0	0	0	0	0	8,000	0
Sub Total	8,300	0	0	0	0	100	8,100	100	0	0	0	0	0	0	8,300	0
Charlestown Headquarters																
Bld. imp. #36	424	0	0	189	95	140	0	0	0	0	0	0	0	0	424	0
Bld. imp. #34	517	0	0	80	317	120	0	0	0	0	0	0	0	0	517	0
Bld. #36 tel.	63	0	0	63	0	0	0	0	0	0	0	0	0	0	63	0
Bld. #34 tel.	70	0	0	70	0	0	0	0	0	0	0	0	0	0	70	0
Bld. #36 furn.	765	89	400	100	176	0	0	0	0	0	0	0	0	0	676	0
Bld. #34 furn	525	0	0	0	275	250	0	0	0	0	0	0	0	0	525	0
Sub Total	2,364	89	400	502	863	510	0	0	0	0	0	0	0	0	2,275	0
Vehicle Maintenance Garage																
Design	50	0	0	0	25	25	0	0	0	0	0	0	0	0	50	0
Construction	200	0	0	0	0	0	50	50	50	50	0	0	0	0	200	0
Sub Total	250	0	0	0	25	75	50	50	50	0	0	0	0	0	250	0
TOTAL BUILDING	$10,914	$89	$400	$502	$888	$685	$8,150	$150	$50	$0	$0	$0	$0	$0	$10,825	$0

FY 1987 - 1989
ADMINISTRATION CAPITAL PROJECTS
PROJECTED QUARTERLY CASH FLOW
(000'S)

PROJECT DESCRIPTION	TOTAL CONTRACT AMOUNT	PREVIOUS PAYMENTS	FISCAL YEAR 1987 JUL-SEP 1986	OCT-DEC 1986	JAN-MAR 1987	APR-JUN 1987	FISCAL YEAR 1988 JUL-SEP 1987	OCT-DEC 1987	JAN-MAR 1988	APR-JUN 1988	FISCAL YEAR 1989 JUL-SEP 1988	OCT-DEC 1988	JAN-MAR 1989	APR-JUN 1989	TOTAL FYS 87-89	BEYOND FY 1989
III. ADMINISTRATION OTHER																
Winthrop Mitigation																
A & C	123	8	12	12	12	12	12	11	11	11	11	11	0	0	115	0
Traffic Signals	350	0	0	0	175	150	25	0	0	0	0	0	0	0	350	0
St. & Utility Repairs	400	0	0	400	0	0	0	0	0	0	0	0	0	0	400	0
Sub Total	873	8	12	412	187	162	37	11	11	11	11	11	0	0	865	0
Technical Assistance																
Sanitary	250	0	0	0	25	25	25	25	25	25	25	25	25	25	250	0
Electrical	370	0	0	0	37	37	37	37	37	37	37	37	37	37	370	0
HVAC	370	0	0	0	37	37	37	37	37	37	37	37	37	37	370	0
Mechancial	250	0	0	0	25	25	25	25	25	25	25	25	25	25	250	0
Stuctural	250	0	0	0	25	25	25	25	25	25	25	25	25	25	250	0
Materials Testing	250	0	0	0	25	25	25	25	25	25	25	25	25	25	250	0
Environmental Test	250	0	0	0	25	25	25	25	25	25	25	25	25	25	250	0
Geo Technical	250	0	0	0	25	25	25	25	25	25	25	25	25	25	250	0
Surveying	250	0	0	0	25	25	25	25	25	25	25	25	25	25	250	0
Claims Management	250	0	0	0	25	25	25	25	25	25	25	25	25	25	250	0
Contract Review	100	0	0	0	25	50	25	0	0	0	0	0	0	0	100	0
Sub Total	2,840	0	0	0	299	324	299	274	274	274	274	274	274	274	2,840	0
Constr. Mgat. Study	150	0	0	0	0	0	0	25	50	50	25	0	0	0	150	0
Eng. Feasibility Stu	250	0	0	0	0	25	25	50	0	150	0	0	0	0	250	0
Harbor Research & Monitoring Program	550	0	0	0	50	50	50	50	50	50	50	50	50	50	500	50
Mgat. Systems Dev.																
Comp. Consultant	184	61	73	50	0	0	0	0	0	0	0	0	0	0	123	0
Study	150	0	0	0	0	25	75	35	15	0	0	0	0	0	150	0
Materials Mgat.	75	0	0	0	0	0	15	15	15	15	10	5	0	0	75	0
Sub Total	409	61	73	50	0	25	90	50	30	15	10	5	0	0	348	0
Capital Program Consultants	315	0	25	25	25	30	25	25	25	30	25	25	25	30	315	0

FY 1987 - 1989
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Management Information Systems																
Data Proc. Needs Study	250	0	0	75	75	75	25	0	0	0	0	0	0	0	250	0
Hardware Aquisition	800	0	0	0	0	0	0	0	0	260	300	200	40	0	800	0
Software Aquisition	2500	0	0	0	0	0	0	0	250	250	250	250	250	500	1,750	750
Word Processing	250	0	0	0	50	50	50	100	0	0	0	0	0	0	250	0
Sub Total	3,800	0	0	75	125	125	75	100	250	510	550	450	290	500	3,050	750
TOTAL:OTHER	$9,187	$69	$110	$562	$686	$741	$601	$585	$690	$1,090	$945	$815	$639	$854	$8,318	$800
TOTAL:ADMINISTRATION	$25,213	$158	$1,910	$1,684	$2,475	$2,724	$9,151	$892	$940	$1,226	$945	$815	$639	$854	$24,255	$800
CAPITAL BUDGET CONTINGENCY																
FY 87	11,500	0	0	1,000	1,000	1,000	1,000	1,000	1,000	1,100	1,100	1,100	1,100	1,100	11,500	0
FY 88	13,800	0	0	0	0	0	1,150	1,150	1,150	1,150	1,150	1,150	1,150	1,150	9,200	4,600
FY 89	22,300	0	0	0	0	0	0	0	0	0	1,800	1,800	1,800	1,800	7,200	15,100
Sub Total	47,600	0	0	1,000	1,000	1,000	2,150	2,150	2,150	2,250	4,050	4,050	4,050	4,050	27,900	19,700
TOTAL CONTINGENCY	$47,600	$0	$0	$1,000	$1,000	$1,000	$2,150	$2,150	$2,150	$2,250	$4,050	$4,050	$4,050	$4,050	$27,900	$19,700